

WHAT GETS TRANSFERRED IN L3 ACQUISITION?
DITRANSITIVES AND PASSIVIZATION OF THE DOUBLE OBJECT CONSTRUCTION
IN L3 MANDARIN

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Jing ‘Crystal’ Zhong

Dissertation Committee:
Bonnie D. Schwartz, Chairperson
Kamil Deen
Li ‘Julie’ Jiang
William O’Grady
Amy Schafer

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ABSTRACT

This dissertation contributes new data to the debate on the source and manner of transfer in third language (L3) acquisition. The *L1 Status Factor* (L1SF, e.g., Hermas, 2010; Leung, 2002; Lozano-Pozo, 2003) maintains that the transfer source is the native language (L1), whereas the *L2 Status Factor* (L2SF, Bardel & Falk, 2007) maintains it is the second language (L2). The *Typological Primacy Model* (TPM, e.g., Giancaspro, Halloran, & Iverson, 2015; Rothman, 2010, 2011) proposes that the source of transfer is determined by (perceived) structural/typological similarity between the L3 and either the L1 or the L2; it also proposes that the transfer happens in a wholesale manner at the initial stages of L3 acquisition. Others propose property-by-property transfer, as in the *Linguistic Proximity Model* (e.g., Westergaard, 2021; Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017) and the *Scalpel Model* (Slabakova, 2017). These hypotheses are tested in this study with less-studied L3 learner populations: L1Cantonese–L2English–L3Mandarin (CEM, $n = 32$) learners and L1Korean–L2English–L3Mandarin (KEM, $n = 34$) learners. Moreover, the dissertation also explores whether L2 proficiency—a potentially important yet understudied factor—plays a role in determining the source of transfer.

The learners completed—in addition to English and Mandarin proficiency tests and a background questionnaire—acceptability judgment tasks (AJTs) in both their L2 (English) and their L3 (Mandarin). Native speakers of the four languages involved serve as controls, completing the AJT in their respective L1 as well as a background questionnaire. There are five linguistic phenomena tested: (a) the Double Object Construction (DOC, e.g., *John gave Mary a letter*); (b) the Prepositional Dative Construction (PDC, e.g., *John gave a letter to Mary*); (c) the Reverse PDC (e.g., **John gave to Mary a letter*); (d) Passivization of the Recipient (POR) in the

DOC (e.g., *Mary was given a letter by John*); and (e) Passivization of the Theme (POT) in the DOC (e.g., * *A letter was given Mary by John*). Crucially, the learners' L1s (i.e., Cantonese or Korean) and their L2 Target Language (English) behave differently across these constructions. All native speakers' results confirmed the judgments described in the literature, as summarized in Table 1.

Table 1
Similarities and Differences Among English, Cantonese, Korean, and Mandarin

	DOC	PDC	Reverse PDC	POR	POT
English (L2)	✓	✓	x	✓	x
Cantonese (L1)	x	✓	x	x	x
Korean (L1)	x	✓	✓	x	x
Mandarin (L3)	✓	✓	x	x	✓

Note. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

There are three principal findings in this study: First, results from both the CEM learners and the KEM learners suggest that the source of transfer is the L1 (with one exception on a single phenomenon by a KEM learner). The transfer patterns that emerged in the CEM and KEM learners of this study are therefore compatible with both the L1SF and the TPM (with, unfortunately, no way to decide between the two). Second, since the L1 is overwhelmingly implicated as the transfer language, it is thus unsurprising that no significant correlation was found between L2 proficiency and the source of transfer. Third, again as a consequence of transfer being, in essence, restricted to the L1, no evidence was found to support the property-by-property transfer hypothesis, and hence the transfer patterns of the CEM and KEM learners are compatible with the wholesale transfer hypothesis.

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LIST OF ABBREVIATIONS

This dissertation uses Hong Kong Society of Linguistics Romanization to transcribe Cantonese words, Pinyin to transcribe Mandarin words, and Yale Romanization to transcribe Korean words. The following abbreviations are used to label linguistic terms.

1SG	First person singular
3SG	Third person singular
Acc	Accusative case marker
Cl	Classifier
Dat	Dative case marker
Dec	Declarative suffix
Nom	Nominative case marker
Pass	Passive Marker
Part	Sentence Final Particle
Perf	Perfective Marker
Pst	Past Tense
Top	Topic marker

Chapter 1. Introduction

After many decades of acquisition research on first language (L1) and second language (L2), more and more researchers have finally turned their attention to the emerging field of third language (L3) acquisition out of a belief that it will provide new insights that neither L1 studies nor L2 studies can. One central issue that has been investigated within the generative paradigm is the role previous linguistic knowledge plays in L3-Interlanguage development, which is the focus of this dissertation. Several competing models of L3 transfer have been proposed in the past fifteen years or so. One approach, which will be called the *L1 Status Factor* (Hermas, 2010; Leung, 2002; Lozano-Pozo, 2003), argues that the source of transfer is the L1. In contrast, the *L2 Status Factor*, first proposed by Bardel and Falk (2007), argues that the source of transfer is the L2-Interlanguage. The *Typological Primacy Model* (e.g., Giancaspro, Halloran, & Iverson, 2015; Rothman, 2010, 2011) has challenged the previous two models by arguing that the source of transfer is determined by the perceived “structural proximity between the L3 and the L1 and/or L2” (Rothman, 2015, p. 179) rather than the order of acquisition; it also assumes wholesale transfer at the initial stages of L3 acquisition in the vein of Schwartz and Sprouse’s (1994, 1996) Full Transfer/Full Access model for L2 acquisition. By contrast, another line of research has proposed property-by-property transfer, as in the *Linguistic Proximity Model* (Westergaard, 2021; Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017) and the *Scalpel Model* (Slabakova, 2017). Some of the factors that have been suspected of influencing the source of transfer are linguistic proximity and language dominance.

This study aims to test the competing models mentioned above with a less-studied learner population: L3 learners (L3ers) of Mandarin. It also aims to explore whether L2 proficiency—an important yet understudied factor—plays a role in determining the source of transfer. A novel experimental design was constructed in pursuit of these goals, one that involves four groups of L3ers of Mandarin whose L2 is English and whose L1s are Cantonese or Korean. The linguistic phenomena chosen for this study are the Double Object Construction (DOC, as in (1a)), the Prepositional Dative Construction (PDC, as in (1b)), the Reverse PDC (as in (1c)), Passivization of the Recipient (POR) in the DOC (as in (1d)) and Passivization of the Theme (POT) in the DOC (as in (1e)).

- | | | | |
|-----|----|------------------------------------|---------------|
| (1) | a. | John gave Mary a letter. | (DOC) |
| | b. | John gave a letter to Mary. | (PDC) |
| | c. | * John gave to Mary a letter. | (Reverse PDC) |
| | d. | Mary was given a letter by John. | (POR) |
| | e. | * A letter was given Mary by John. | (POT) |

These linguistic phenomena were chosen because the L1s (i.e., Cantonese and Korean) and the L2 (English) behave differently in these constructions, allowing us to pinpoint the source of transfer. This study's main task is an acceptability judgment task. One methodological highlight of this study is that the L3ers were tested in their L2 and L3 (in the same testing session). It is well known in the L2 acquisition literature that the L2-Interlanguage grammar does not necessarily converge on the target grammar. If the L3ers' L2-Interlanguage is not tested, and researchers just assume that the L3ers' L2-Interlanguage is target-like, the real source of transfer may be obscured.

This dissertation is organized as follows: Chapter 2 reviews six competing models of transfer in L3 acquisition. Chapter 3 presents the pertinent crosslinguistic differences between English (§3.1), Cantonese (§3.2), Korean (§3.3), and Mandarin (§3.4) regarding the DOC, PDC, Reverse PDC, POR, and POT. Chapter 4 reviews the relevant literature on the L2 acquisition of ditransitives in Mandarin (§4.1) and English (§4.2). Chapter 5 details the experimental design of this study and the logic behind the design. The results are presented in Chapter 6. Chapter 7 concludes the dissertation and points out directions for future research.

Chapter 2. Literature Review on Different Models of Transfer in L3 Acquisition

The last two decades have witnessed a growing interest in the study of L3 acquisition from a range of linguistic perspectives (Rothman, Cabrelli Amaro, de Bot, 2013). One central issue that has been investigated is the source of transfer in L3 acquisition. Since it is more or less accepted that at least some transfer happens at some point in L3 acquisition (Rothman, 2010), the unique question in this scenario is whether one or both of the previously-acquired linguistic systems is involved in such transfer. There is also the question of whether the transfer happens in a wholesale or property-by-property fashion. In the investigation of these questions, several different models have been proposed in the literature. In the following sections, I begin by reviewing two models of morphosyntactic transfer in L3 acquisition that assume special status of either the L1 (the *L1 Status Factor*) or the L2-Interlanguage (the *L2 Status Factor*).¹ Next, I review a model that explicitly advocates wholesale transfer, i.e., the *Typological Primacy Model*, which states that the language which is perceived to be more structurally or typologically similar will be the source of transfer in L3 acquisition. I then present two models that assume property-by-property transfer, namely the *Scalpel Model* and the *Linguistic Proximity Model*. Lastly, a more recent proposal that I will call the *Principal Language of Communication Model* is introduced. This proposal does not specifically address the wholesale vs. property-by-property debate.

2.1 L1 Status Factor

Some of the existing work on L3 acquisition has argued that the first language plays a dominant role in language transfer. One of the earliest and most cited studies that has provided evidence in support of the *L1 Status Factor* (L1SF) was carried out by Na Ranong and Leung (2009), who compared the performance of L1Thai–L2English–L3Mandarin (henceforth, “TEM”) learners and L1English–L2Mandarin (henceforth, “EM”) learners on a written offline task that examined the interpretation of embedded null objects. The TEM participants were classified as

¹ As Schwartz & Sprouse (2021a, p. 2) remind us, despite the fact that the L3 acquisition literature more often than not talks about transfer from the “L2,” this is a shorthand for transfer from the “L2-Interlanguage” at whatever stage it happens to be.

high-intermediate/advanced L2 English learners and beginning/pre-intermediate L3 Chinese learners according to standardized test results.

Thai and Mandarin allow null objects, while English disallows them. Huang (1984) claimed that Mandarin embedded null objects cannot be coindexed with the matrix subject. In contrast, Thai null objects can be coindexed with the matrix subject (Pingkarawat, 1989). Na Ranong and Leung asked participants to read bi-clausal Mandarin sentences containing an embedded null object or an overt pronominal object (e.g., *Zhangsan shuo Lisi bu renshi Ø/ta* “Zhangsan said Lisi does not know Ø/him”; note that the “Ø” symbol was presented in the task) and indicate who the object (Ø or *ta*) could refer to. They were given five options; for the example sentence here, these were: (a) my father; (b) Zhangsan; (c) Yuanyuan; (d) Lisi; (e) none of the above.²

Native Mandarin speakers interpreted the null object as being coindexed with the matrix subject 62% of the time, while they interpreted the overt pronominal object as being coindexed with the matrix subject 78% of the time; a paired-sample *t*-test indicated that the rate difference between null objects and overt pronominal objects was statistically significant. The TEM learners displayed similar patterns of results when tested in Thai and Mandarin. They interpreted the null object as being coindexed with the matrix subject 70% of the time in Thai and 61% of the time in Mandarin, and a paired-sample *t*-test revealed that there was no statistically significant difference between their performance in the two languages. Moreover, they interpreted the overt pronominal object as being coindexed with the matrix subject 81% of the time in Thai and 83% of the time in Mandarin, and there was no significant difference between the ratings in this case, either. In both Thai and Mandarin, there was a significant difference between the TEM learners’ judgments for null objects vs. overt pronominal objects. Conversely, the EM learners identified the matrix subject as the antecedent 64% of the time for null objects and 76% of the time for overt pronominal objects when tested in Mandarin, and the difference between their judgments for null vs. overt pronominal objects did not reach statistical significance.

In summary, the results suggested that TEM learners made a distinction between null and overt pronominal objects in Mandarin, while EM learners did not. Na Ranong and Leung

² Options (a) and (c) were not introduced in the discourse of the experimental item. They were outside of the context so they should be grammatical according to Huang (1984).

attributed the difference between these two groups to the different sources of transfer: Thai for the TEM group and English for the EM group. They based this conclusion on the assumption that EM learners treated Mandarin null and overt pronominal objects alike, specifically, as the equivalent of English overt pronominal objects, which in embedded clauses can be coindexed with the matrix subject. Had the TEM learners transferred English to the L3 (Mandarin), the authors reasoned, then they would have behaved like the EM learners in the Mandarin task.

However, there are limitations to this study. First, the results from the interpretation task only reflect the participants' interpretation preference; they cannot tell us what is *disallowed* in the learners' grammatical representations of null objects in Mandarin, because the task did not ask the participants what the overt or covert pronouns cannot refer to. Second, the TEM learners were not tested on null objects in English, so we do not know for certain that their L2-English Interlanguage grammars disallowed null objects. Therefore, we cannot rule out the possibility that the source of transfer in the L3 might be a non-target-like L2-Interlanguage grammar. Third, since the participants' responses on a language closeness task indicated that Thai is closer to Mandarin than English is, it is also possible that the extent of perceived structural similarity between Thai and Mandarin (vs. English and Mandarin) is what determined the source of transfer (see §2.3). Lastly, the TEM and EM learners' Mandarin proficiency was not tested in the study, so it is unclear whether the two groups were matched for Mandarin proficiency, much less whether the participants were true beginning learners of Mandarin.

A later study that found stronger evidence for L1 transfer in the initial stages of L3 acquisition was conducted by Hermas (2014). This study tested L1 Moroccan Arabic–L2 French–L3 English adults on sentences containing three types of relative clauses (RCs), i.e., subject RC, direct object RC, and oblique RC. In English and French, RCs contain gaps but not resumptive pronouns, whereas in Moroccan Arabic, resumptive RCs are possible. In Moroccan Arabic, subject RCs have a null *pro* because of the null subject property of Moroccan Arabic; direct object RCs optionally have a clitic or null pronoun in the object position; and oblique RCs require an overt resumptive pronoun because Moroccan Arabic disallows preposition stranding. Since the most compelling evidence for L1 transfer comes from the oblique RCs, for which an overt resumptive pronoun is obligatory in Moroccan Arabic, I will focus on the findings about participants' performance on oblique RCs in this review.

There were two groups of learner participants: eight beginning and 14 advanced L3ers of English. They completed a series of 4-point scale acceptability judgment tasks (AJTs) and preference tasks in both French and English. In the French AJT, Hermas found that the beginning learners' accuracy on French oblique RCs was 93% in the gap condition and 75% in the resumptive pronoun condition, and there was no statistically significant difference between these two conditions. In the preference task, the participants were presented with gap and resumptive pronoun RCs in pairs (e.g., A. *La cause pour laquelle je m'engage est noble*. "The cause to which I am committed is noble." vs. B. **La cause que je m'engage pour elle est noble*. "The cause which I am committed to **it** is noble.") and were then asked to choose one of the following four options (in French): (a) both sentences are unacceptable; (b) sentence A is better than sentence B; (c) sentence B is better than sentence A; (d) both sentences are acceptable. The learners' accuracy on the oblique RCs in the preference task was only 64%, but Hermas attributed this to a processing effect rather than to grammar because of the learners' high overall accuracy on oblique RCs in the AJT, arguing that the participants preferred oblique RCs with resumptive pronouns because they were easier to process than those with gaps.

Despite their (alleged) target-like performance in L2 French, the beginning L3 participants' accuracy on oblique RCs in the English AJT was relatively low (50% for the gap condition and 43% for the resumptive pronoun condition). Mann-Whitney U tests were conducted and revealed that they differed significantly from the native English speakers. The results from the preference task were similar, i.e., the accuracy rate for the oblique condition was 47%. Hermas took these results as evidence that the beginning-level L3ers had English-Interlanguage grammars that form RCs via the resumptive strategy rather than the gapping strategy, a finding that he attributed to L1 influence from Moroccan Arabic.³ However, the participants' chance-level accuracy rate on English oblique RCs deserves reconsideration. It might indicate that the participants could not commit to a judgment on the property because of their low proficiency in English. Moreover, Hermas did not conduct individual analyses of the data (possibly due to the small number of participants) to see if there was inter-participant variation.

³ Note these results seem to challenge the *Typological Primacy Model* (TPM, see §2.3), since French is (presumably perceived to be) typologically/structurally more similar to English than Arabic is.

2.2 L2 Status Factor

The main claim of the *L2 Status Factor* (L2SF) hypothesis (Bardel & Falk, 2007; Falk & Bardel, 2011) is that the L2 supersedes the L1 as the source of transfer in L3 acquisition because of the “higher cognitive similarity between L2[-Interlanguage] and L3[-Interlanguage]” (Falk & Bardel, 2011, p. 61). This similarity between the representation of the L2-Interlanguage and that of the L3-Interlanguage is the result of a set of cognitive similarities between L2 acquisition and L3 acquisition, such as age of onset, degree of metalinguistic awareness, and degree of awareness of the language learning process (Falk & Bardel, 2011, p. 63). Specifically, Bardel and Sanchez (2017) clarified that the L2 status is not simply a matter of the chronological order of acquisition. They follow Paradis’ (2004, 2009) model of declarative and procedural memory, stating that the L2 status is a matter of the differences between explicit knowledge and implicit competence, which are subserved by declarative memory and procedural memory, respectively. They hypothesized that when L2-Interlanguage and L3-Interlanguage are learned in a similar manner as a function of explicit metalinguistic knowledge subserved by declarative memory (as opposed to the L1 grammar that is acquired implicitly and subserved by procedural memory), transfer to an L3-Interlanguage is more likely to happen from an L2-Interlanguage than from an L1. Falk and Bardel (2011) also hypothesized that the learner must reach a certain level of proficiency in the L2-Interlanguage in order for the transfer of its (complex) syntax to occur in L3 acquisition.

One piece of supporting evidence for this model comes from Falk and Bardel (2011), who used a combined acceptability judgment and correction task to investigate the acquisition of object pronoun placement in L3 German with a clever mirror-image design, which is schematized in (2), in order to tease apart the L2SF and the *Typological Primacy Model*.

(2) L1-**A**→L2-**B**→L3-C compared with L1-**B**→L2-**A**→L3-C

In a mirror-image design, the target L3 is held constant, and the L1 and L2 swap order between the two participant groups. Falk and Bardel compared L1English–L2French–L3German (EFG) learners with L1French–L2English–L3German (FEG) learners. All of the learners were in their first or second year of learning German, and they were at B1 level (intermediate) according to the Common European Framework of Reference for Languages (Council of Europe, 2001).

In German, object pronouns (of tensed thematic verbs) are post-verbal in main clauses because of the verb-second (V2) property, but they are pre-verbal in subordinate clauses because of the basic SOV word order. In English, object pronouns are always post-verbal no matter the clause type, while in French, clitic object pronouns are preverbal in both main and subordinate clauses. A summary of the relative word order in these three languages is presented in Table 1.

Table 1
Summary of the Relative Word Order Between (Finite Thematic) Verb and Object Pronoun in German, English, and French

Clause type	German	English	French
Main clause	[V Pron]	[V Pron.]	[Pron. V]
Subordinate clause	[Pron. V]	[V Pron.]	[Pron. V]

It is clear from the table that the linguistic properties and the language triads in this study form an ideal combination for testing L3 transfer models, because the L1 and L2 pattern in distinct ways on the two linguistic properties, making it possible to identify the source of transfer.

As previously mentioned, the participants in the study completed a combined acceptability judgment and correction task. The German test sentences comprised both grammatical and ungrammatical main clauses and both grammatical and ungrammatical subordinate clauses regarding the placement of the object pronoun. For the ungrammatical main clauses which correspond to *French* word order, i.e., [Pron. V], the EFG learners rejected the sentences only 29% of the time, while the FEG learners correctly rejected the sentences 93% of the time. Likewise, for the sentences with ungrammatical subordinate clauses which correspond to *English* word order, i.e., [V Pron.], the FEG learners rejected the sentences only 39% of the time, while the EFG learners correctly rejected the sentences 82% of the time. We might be tempted to conclude that the FEG learners transferred their L2 (English) properties to German and the EFG learners transferred their L2 (French) properties to German just looking at the results on ungrammatical sentences. However, such clear transfer effects were not observed for the grammatical sentences. For the grammatical main clause items which correspond to *English* word order, i.e., [V Pron.], the FEG learners accepted the sentences at an overwhelmingly high rate of 95%, and the EFG learners accepted the sentences at a lower rate of 63%. For the grammatical subordinate clause items corresponding to *French* word order, i.e., [Pron. V], both

the EFG and FEG learners accepted the sentences at a high rate (92.6% and 86.3%), and there is no statistically significant difference between the two groups. This does not follow what the L2 Status Factor predicts, namely: that the EFG group will accept the grammatical subordinate clauses to a significantly higher degree than the FEG group will. Another limitation of this study, like Na Ranong and Leung (2009), is that the authors did not test the L3ers' L2-Interlanguage on object placement. Moreover, it is unclear how the L2SF can account for the clear L1 transfer effects that have been observed in other L3 studies.

2.3 Typological Primacy Model

Unlike the previous models that advocate absolute L1 or L2-Interlanguage transfer, the *Typological Primacy Model* (TPM; e.g., Rothman, 2010, 2011, 2015) proposes that in the initial stages of L3 acquisition, one of the previously-acquired linguistic systems is selected for transfer based on the perceived typological/structural similarity between it and the target language. For Rothman, (perceived) typological/structural similarity refers to “linguistic properties that overlap cross-linguistically at the level of mental representation” (2015, p. 179). Rothman (2015) further proposed that such underlying typological/structural similarity is assessed and determined subconsciously by the parser based on an implicational hierarchy of linguistic cues:

(3) Lexicon → Phonological/Phonotactic cues → Functional morphology → Syntactic structure

The hierarchy is said to operate as follows: After initial exposure to L3 input, the parser first picks up on the similarity between items in the lexicons of the L3 and previously-learned languages. If there is enough lexical similarity (e.g., cognates) between the L3 and one of the previously-learned languages, the parser will identify that previously-learned language as typologically/structurally more similar to the L3. If there is not enough similarity at the lexical level, the parser will move up the hierarchy to search at the next level, i.e., phonological/phonotactic cues, until it can identify one of the previously-learned language as typologically/structurally more similar to the L3 (and so on up the hierarchy). Rothman (2015) claims that detecting lexical similarity is much more straightforward than detecting similarities at the other three levels.

Once the parser identifies the transfer language, transfer happens in a wholesale manner in the same sense as “Full Transfer” hypothesized by Schwartz and Sprouse (1996) for L2 acquisition, i.e., the entirety of one of the previously-acquired grammars (e.g., its abstract morphosyntactic properties) carries over to the initial stages of the L3-Interlanguage grammar, and subsequent restructuring occurs when L3 input cannot be parsed by the current state of the L3-Interlanguage grammar. The motivation for wholesale transfer in the TPM is claimed to be cognitive economy. As Rothman (2015) put it, it is “the mind’s predisposition to put forth the least amount of effort towards a cognitive task” (p. 180), and property-by-property transfer is, it is claimed, inherently more costly and slower in consideration of the complex processes involved in managing multiple active grammars in the mind.⁴

Note also that unlike Falk and Bardel (2011), Rothman (2015) hypothesized that the developing L2-Interlanguage grammar, regardless of proficiency level, can be transferred, as long as it meets the parser’s criteria for determining typological/structural similarity.

In recent years, an increasing number of studies on L3 acquisition have provided evidence in support of the TPM. One of the earliest studies that hinted at the basic tenets of the TPM was conducted by Rothman and Cabrelli Amaro (2010), who designed an experiment to test the Null-subject Parameter in two groups of L3ers: L1English–L2Spanish–L3Italian (ESI) learners and L1English–L2Spanish–L3French (ESF) learners. Among the four languages involved, Italian and Spanish are null-subject languages that prohibit overt expletive subjects, while English and French disallow null subjects and require overt expletive subjects. In a combined acceptability judgment and correction task, the ESI group and the ESF group both showed low rates of rejection for null subjects and high rates of rejection for overt expletive subjects in their respective L3-Interlanguages, which is indicative of transfer from Spanish (target-like for ESI but not target-like for ESF). However, as Rothman and Cabrelli Amaro (2010) admitted, this finding is compatible with both the L2SF and the TPM because Spanish is typologically/structurally closer to Italian and French than English is.

In order to tease apart the L2SF and the TPM, Giancaspro et al. (2015) used a mirror-image design, comparing L1English–L2Spanish–L3Brazilian Portuguese (ESB) learners

⁴ Note that Schwartz and Sprouse (2021b) invoke Occam’s razor for Full Transfer being the “conceptually simplest and most elegant view of transfer” (Schwartz & Sprouse, 1996, p. 41), making the point that “this position should not be misconstrued as an appeal to *cognitive* economy [emphasis original]” (Schwartz & Sprouse, 2021b, p. 490).

($n = 14$) to L1Spanish–L2English–L3Brazilian Portuguese (SEB) learners ($n = 9$). In this language triad, Spanish is structurally more similar to Brazilian Portuguese (BP) than English is. The linguistic phenomenon under investigation was differential object marking (DOM). Specifically, in Spanish, [+animate, +specific] direct objects are obligatorily marked by the preposition *a*, while there is no DOM in English and BP. A 4-point-scale AJT was used to test whether beginning-level L3ers transfer the DOM property of Spanish to their BP, as predicted by the TPM. Each participant completed the tasks in Spanish and English, in addition to in BP. Both L3 groups rejected DOM in English; importantly, they also correctly rejected [+animate, +specific] objects without DOM in Spanish, which indicates that they possessed target-like knowledge of DOM in Spanish. In the BP version of the task, the ESB and SEB groups gave similar ratings (between 2.5 to 3) on the [+animate, +specific] sentences with and without DOM.

The authors took the results to indicate that both L3 learner groups accepted DOM in BP. They argued that this suggests that the L3 participants selected Spanish as the source of transfer regardless of whether it was the L1 or the L2-Interlanguage, thus supporting the TPM. However, it is worth pointing out that this conclusion is based on participants' non-distinction between [+DOM] and [–DOM] sentences with [+animate, +specific] direct objects. The learners' ratings (between 2.5 and 3) fell in the mid-range of the 4-point scale, which could indicate that they simply did not have strong judgments about the two conditions. Moreover, the authors did not conduct individual analysis to see whether there was inter-participant variation.

Despite such supporting evidence for the TPM, there are some limitations to this model in its current state. As pointed out by Falk and Bardel (2021), most of the studies providing evidence for this model involve language triads in which one of the previously-acquired languages is structurally very similar to the target language (e.g., two Romance languages), while the other previously-acquired language is relatively different (e.g., English). In addition, even though Rothman proposed the implicational hierarchy of linguistic cues that the parser uses to determine structural similarity, they have yet to demonstrate whether or how it can be used by researchers to make predictions in situations where determining which one of the previously-acquired languages is structurally more similar to the L3 target language is not straightforward. An example is the configuration of L1Spanish–L2Catalan–L3English vs. L1Catalan–L2Spanish–L3English in Puig-Mayenco and Rothman's (2020) study. In this case, Spanish and Catalan are closely related and share a lot of similarities in lexicon, pronunciation,

and morphosyntax. However, it is Catalan that was perceived to be more similar to English and selected as the transfer language. More empirical studies on varied language triads are needed to test the implicational hierarchy.

We now turn to L3 transfer models that explicitly reject wholesale transfer.

2.4 Scalpel Model

The *Scalpel Model* (Slabakova, 2017) is a proposal that assumes property-by-property transfer. Rejecting the idea that either the L1 or the L2-Interlanguage enjoys a special status in influencing the development of the L3-Interlanguage, it maintains that in L3 acquisition “the activated grammatical possibilities of the L1 plus L2[-Interlanguage] grammars act with a *scalpel-like precision* [emphasis original], rather than as a blunt object, to extract the enhancing, or facilitative, options of L1 or L2[-Interlanguage] parameter values” (Slabakova, 2017, p. 661). This process is on-going in L3-Interlanguage development beyond the initial stages. However, Slabakova stated that non-facilitative transfer⁵ is still possible because “additional factors such as processing complexity, misleading input, and construction frequency in the target L3 are also operative” (p. 661). She explicitly dismissed wholesale transfer, stating that blocking off some crosslinguistic influence that may facilitate acquisition at the beginning is very costly, *contra* Rothman’s (2015) cognitive economy contention regarding wholesale transfer. The problem with this model is that it does not address how the metaphorical scalpel “knows” which option (L1 or L2-Interlanguage) is facilitative in advance. Moreover, it is not specified precisely under what conditions the “additional factors” would weigh in, which deprives this model of any predictive power (see Schwartz & Sprouse, 2021a, 2021c).

Slabakova cited findings from a variety of studies in the literature to support her model. For instance, she reviewed how non-facilitative transfer arises using the data in Slabakova and García Mayo (2015). The study examined the acquisition of topicalization by L1Basque–L2Spanish–L3English and L1Spanish–L2Basque–L3English learners whose L3 English proficiency varied from intermediate to advanced level. English and Basque object topicalization moves the object to the left periphery without a resumptive pronoun at the foot of the dependency (see example (4a)), while Spanish (object) clitic left dislocation—a construction that

⁵ Note that *facilitative transfer* is traditionally called “positive transfer,” i.e., the result of transfer is target-like, and *non-facilitative transfer* is traditionally called “negative transfer,” i.e. the result of transfer is non-target-like.

contains a fronted topic—requires a resumptive clitic that agrees with the object on the left periphery, as illustrated in (4b).

(4) a. Q: Did Susie like the wine?

A: The wine she didn't drink (*it). She stuck to lemon ices.

(Slabakova, 2017, p. 657, (1))

b. A sus amigos Pedro los invit-ó a cenar.

to his friends Pedro ACC.CL.3M.PL invite-Pst to dine

“As for his friends, Pedro invited them to have dinner.”

(Slabakova & García Mayo, 2015, p. 212, (4a))

In an English AJT containing topicalizations with and without a resumptive pronoun, the two groups of L3ers were found to make no distinction between the acceptable and unacceptable English topicalizations—their ratings on both conditions being at the mid-range of a 7-point scale. Slabakova and García Mayo interpreted this result as evidence of non-facilitative transfer from Spanish. They attributed the “blunting of the scalpel” in this case to the low frequency of topicalization as well as the misleading evidence of left dislocation in English, which constitutes a left-adjoined phrase coindexed with a pronoun in an argument position, as illustrated in (5).

(5) My wonderful Felix, everyone adores *(him).

(Slabakova, 2017, p. 657, (2))

One limitation to this study is that the participants were not tested on topicalization in their L2-Interlanguage grammar. Moreover, the explanation of how non-facilitative arises is entirely post hoc and cannot be generalized.

2.5 Linguistic Proximity Model

The *Linguistic Proximity Model* (LPM; Westergaard, 2021; Westergaard et al., 2017) claims that the similarity of specific abstract linguistic properties plays a major role in determining the source of L3 transfer, hence the name “linguistic proximity.” Moreover, like the

Scalpel Model, it rejects the notion that transfer is wholesale. Instead, Westergaard et al. (2017) maintained that “[L3] acquisition involves incremental property-by-property learning” (p. 670).

Another claim of the LPM that is shared with the Scalpel Model is that both the L1 grammar and the L2-Interlanguage grammar are accessible to the learner throughout the course of L3 acquisition; in the LPM, however, “[c]rosslinguistic influence occurs when a particular linguistic property in the [L3] input reveals abstract similarity with linguistic properties of the previously-learned languages” (Westergaard et al., 2017, p. 670). Specifically, transfer is instigated when the learner is able to parse the L3 input using a piece of structure (a “micro cue”) from one/both of the previously-acquired grammars and that piece of structure is then added to the developing L3 grammar; this two-step process is an instantiation of what Westergaard (2021) called “learning by parsing.” Westergaard (2021) also stated that facilitative and non-facilitative transfer are both possible. Non-facilitative transfer arises when the parser misanalyzes L3 input and assumes that it can be parsed by a piece of already existing structure in the previous grammar(s), which is the so-called “micro-cue.”⁶

Westergaard et al. (2017) tested this hypothesis in an AJT examining the acquisition of sentence-medial adverb placement (and another property that will not be discussed here). There were three groups of participants: 22 Norwegian/Russian simultaneous bilinguals learning English as an L3 (N/RE); 46 L1Norwegian–L2English (NE) learners; and 31 L1Russian–L2English (RE) learners. All of the participants were secondary school students who had studied English for five to six years at school. In terms of sentence-medial adverb placement, English and Russian adverbs occur before the tensed verb (SAdvVX), while (non-sentence-initial) adverbs in (V2) Norwegian occur after the tensed (matrix) verb (SVAdvX). According to Westergaard et al., the LPM predicts that for sentence-medial adverb placement, the N/RE L3ers should outperform the NE L2 learners (L2ers) due to their knowledge of Russian but should also score lower than the RE L2ers due to influence from Norwegian. The results showed that the prediction was borne out, at least in the grammatical condition: For grammatical adverb placement sentences, the accuracy rate of the N/RE L3ers (65%) was between the accuracy rates of the NE L2ers (55%) and the RE L2ers (83%).

⁶ The notion of property-by-property learning in the LPM is an extension of the Micro-cue Model that Westergaard (2009) developed to account for L1 acquisition.

There are a few major problems with this study. First, as Schwartz and Sprouse (2021a) noted, Westergaard et al.'s prediction that the L3ers' performance would fall between that of two L2 groups whose L1s diverge on a certain property does not follow from the tenets of the LPM: On the assumption that both the L1 (Norwegian) and L2 (Russian) grammars are accessible during L3 acquisition and that transfer is instigated when the L3 input can be parsed by a piece of structure from one of the existing grammars, then it should be the Russian SAdvVX structure—and *not* the Norwegian SVAdvX structure—that is selected to parse the English SAdvVX string and subsequently added to the L3 grammar (for details, see Schwartz & Sprouse, 2021a). One would therefore expect the L3ers' accuracy to be as high as the RE L2ers' performance, which was not the case. Second, since the L3ers in this study had studied English for five to six years, they were not beginning learners. The results could indicate that the L3ers had originally transferred Norwegian SVAdvX structure and were in the process of recovering from the non-facilitative transfer (see also Cabrelli & Puig-Mayenco, 2021). Lastly, the authors did not test the N/RE L3ers on adverb placement patterns in Norwegian or Russian.

2.6 The Principal Language of Communication Hypothesis

Fallah and Jabbari (2016; 2018) found that there is yet another factor that may influence the (subconscious) transfer decision: the principal language of communication. They stated that the principal language of communication—defined as the spoken language used more frequently by the participants at home, in social contexts and at school—transfers at the initial stages of L3 acquisition, regardless of whether it is the L1 or the L2-Interlanguage. For instance, in Fallah and Jabbari (2018), an AJT and an element-rearrangement task (ERT) were used to test the L3 acquisition of English attributive adjectives by two groups of L1Mazandarani–L2Persian–L3English learners whose principal language of communication was either Mazandarani or Persian. These L3ers were in the initial stages of learning L3 English, as they had approximately 18 to 20 hours of formal instruction at the time of testing. The syntactic phenomenon tested was the placement of attributive adjectives. In English and Mazandarani, attributive adjectives are both pre-nominal, while in Persian, attributive adjectives are post-nominal. In the English AJT, participants were asked to rate items containing both grammatical and ungrammatical placement of attributive adjectives on a 4-point scale: “certainly ungrammatical,” “maybe ungrammatical,” “maybe grammatical,” and “certainly grammatical.” A correct answer was given 3 points and an

incorrect answer 0 points. The results showed that the L3ers with Mazandarani as the principal language of communication had high accuracy scores (52.10 out of 60), while the L3ers with Persian as the principal language of communication had much lower accuracy scores (11.96 out of 60). The same tendency obtained in the ERT, a task where participants were asked to arrange the words presented to them to make “correct” sentences (p. 205). The Mazandarani L3ers scored 11.86 out of 15, and the Persian L3ers scored 3.48 out of 15. These L3 English results suggested that L3ers who mostly use Mazandarani transfer their Mazandarani grammar and L3ers who mostly use Persian transfer their Persian grammar.

The unique contribution of this study is that it proposes a new factor—principal language of communication—that had not received attention in previous L3 transfer studies. It also challenges the TPM, since the TPM predicts that transfer will come from the previously-acquired language that is perceived to be structurally more similar to the target language. The limitation of this study, as the authors pointed out, is that the language triads at issue do not put this hypothesis to the most stringent test to contrast with the TPM. Specifically, the question for future research is whether the principal language of communication will determine the source of transfer in cases where there is clear typological/structural similarity between the L3 and one of the previously-acquired languages.

2.7 Summary

To summarize, I have reviewed a model of L3 transfer that assumes wholesale transfer, i.e., the TPM, and two models that assume property-by-property transfer, i.e., the Scalpel Model, and the LPM. The other three models reviewed—the L1SF, the L2SF, and the Principal Language of Communication Hypothesis—do not explicitly advocate transfer as wholesale or property-by-property. The wholesale transfer model makes clear and falsifiable predictions (but see §2.3 above), while the property-by-property transfer models either have conceptual problems or make unclear (or no) predictions. Nonetheless, the wholesale vs. property-by-property debate is ongoing. Conceptually, there are arguments on both sides: On the one hand, Westergaard (2021) questioned the motivation of cognitive economy for wholesale transfer, stating that it’s unclear why transferring everything all at once is cognitively more economical than transferring a little many times. On the other hand, Schwartz and Sprouse (2021a) argued that the same conceptual objection to partial transfer in L2 acquisition applies “in spades” (p. 11) to

property-by-property transfer in L3 acquisition “because [p]iecemeal [t]ransfer involves many iterations of partial transfer” (p. 11):

[I]t does not seem plausible, in cognitive terms, that ... structures could be “excerpted” from the cognitive state, namely, from the L1 grammar. Indeed, it is difficult to imagine what sort of cognitive mechanism would be involved in extracting a proper subpart from the L1 grammar and using that proper subsystem as the basis for a new cognitive state—but this is precisely what theories of partial transfer amount to. (Schwartz & Sprouse, 1996, p. 66)

Moreover, as pointed out by Miller and Iverson (2021), the property-by-property transfer approach over-relies on retrodiction, i.e., post hoc accounts of observed data. They stated that “such models must overcome a higher burden of proof, perhaps relying on ruling out competing models by capitalizing on data incompatible with the wholesale transfer approach” (p. 85). The authors suggested that empirically, it is possible to obtain strong evidence against the wholesale transfer approach by testing the same group of L3ers on more than one linguistic property at the same time: If there is unassailable evidence that transfer comes from language A for one linguistic property and from language B for another linguistic property, this would constitute strong evidence for the property-by-property transfer approach, and perhaps it is the only type of evidence that can decidedly rule out the wholesale transfer approach. In this sense, the study of L3 acquisition provides a unique opportunity to resolve a debate that L2 studies are not able to do: When a particular linguistic property is found to be transferred in L2 acquisition, there is no way to tell whether it is transferred in one fell swoop with other properties. This is one of the goals the current study aims to achieve.

In the next chapter, the five linguistic phenomena that have been chosen for the current L3 project are discussed, with attention given to some issues of analysis as well.

Chapter 3. Linguistic Background: Ditransitives and Passivization of the Double Object Construction in English, Cantonese, Korean, and Mandarin

The linguistic phenomena under investigation in this study are ditransitives and Passivization of the Double Object Construction. A ditransitive construction is, following Malchukov, Haspelmath, and Comrie (2010), a construction that contains a ditransitive verb denoting transfer of an entity or Theme from an Agent to a Recipient, e.g., *John gave Mary a letter* (see also Dryer, 1986 and Haspelmath, 2005). Note that this definition is phrased in purely semantic terms and that the syntactic manifestation of the arguments is irrelevant.⁷ Ditransitives can be found in many languages around the world. Typological studies suggest that there is variation in the alignment of the coding of the two internal arguments, that is, whether it is the Theme or the Recipient that is coded like the object of a monotransitive verb (Haspelmath, 2005, 2015; Siewierska, 2003). When the Recipient is treated in a special way (e.g., receiving a special case marker or adposition) and the Theme is treated like the object of a monotransitive verb, it is referred to as “indirective alignment,” such as the Prepositional Dative Construction in English (e.g., *John gave a letter to Mary*). When the Theme is treated in a special way and the Recipient is treated like the object of a monotransitive verb, it is referred to as “secundative alignment” (e.g., *The bank provides people with money*). Lastly, when the Recipient and the Theme are both treated the same as the object of a monotransitive verb, it is referred to as “neutral alignment,” such as the Double Object Construction in English (e.g., *John gave Mary a letter*).

This chapter will compare and contrast both ditransitives and Passivization of the Double Object Construction across the four languages involved in the study: English, Cantonese, Korean, and Mandarin. Among these four languages, Cantonese and English constitute one L1–L2 pair and Korean and English constitute a second L1–L2 pair, both with Mandarin as the L3. We will begin with English as a reference point, and expand our survey into Cantonese, Korean, and Mandarin.

⁷ Some authors prefer to reserve the term “ditransitive” for the construction in which both objects are treated like the monotransitive direct object, which is referred to as the “Double Object Construction” in this study.

3.1 English: Ditransitives and Passivization of the Double Object Construction

In English, ditransitives of certain verb classes permit two syntactic variants: the Prepositional Dative Construction (PDC), i.e., [NP_{THEME} PP_{RECIPIENT}], as in (6), and the Double Object Construction (DOC), i.e., [NP_{RECIPIENT} NP_{THEME}], as in (7).

- (6) John gave a letter to Mary. PDC [NP_{THEME} PP_{RECIPIENT}]
- (7) John gave Mary a letter. DOC [NP_{RECIPIENT} NP_{THEME}]

In terms of alignment, the PDC demonstrates indirective alignment, since it is the Recipient that is coded with a special adposition (e.g., *to* in (6)), while the Theme aligns with the object of a monotransitive verb. The DOC demonstrates neutral alignment, since neither the Recipient nor the Theme is coded with a special marker.

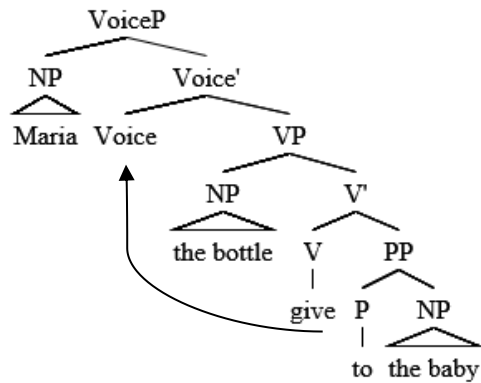
Semantically, the DOC is thought to encode a prospective possession relation (Green, 1974; Gropen, Pinker, Hollander, Goldberg, & Wilson, 1989; Oehrle, 1976; Pinker, 1989). Specifically, the referent of the first object is a prospective possessor of the referent of the second object, as illustrated in the contrast in (8): *Sue* but not *Philadelphia* can be the potential possessor.

- (8) a. The editor sent the article to Sue.
b. The editor sent the article to Philadelphia.
c. The editor sent Sue the article.
d. ?? The editor sent Philadelphia the article.

(Harley, 2002, p. 38, (7))

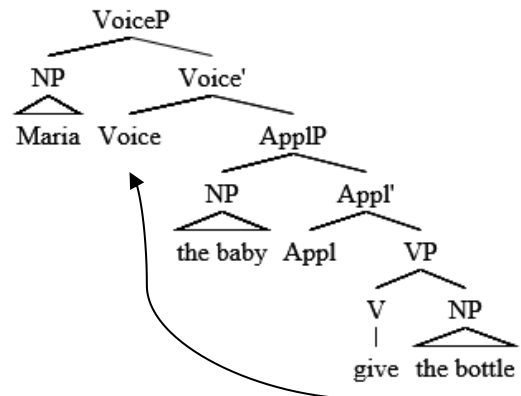
There are various syntactic analyses of the English ditransitive constructions in the literature. One of the more recent ones was put forward by Bruening (2010), who argued that the PDC and the DOC have distinct underlying structures, i.e., the DOC has an Appl(icative) head while the PDC does not. This analysis has been well received by other researchers, and it has been applied to a variety of languages, including Korean and Mandarin. Consider (9a) vs. (9b) for English:

(9) a. PDC



(Bruening, 2010, p. 521, (5))

b. DOC



(Bruening, 2010, p. 521, (4))

In the underlying structure of the PDC illustrated in (9a), the Recipient PP *to the baby* and the Theme *the bottle* are the two internal arguments of the verb *give*, which originates in the V head and subsequently moves to the Voice head. In the DOC shown in (9b), the Recipient *the baby* is introduced in the Specifier of an Appl(icative) phrase (ApplP) immediately above the VP, and the verb *give* has the Theme *the bottle* as its sole argument.

This analysis captures the c-command asymmetry between the two arguments in the PDC and the DOC. In the PDC, the Theme asymmetrically c-commands the Recipient, while in the DOC, the Recipient asymmetrically c-commands the Theme (Larson, 1988), as illustrated in (10) and (11) with respect to the licensing of anaphors.

- (10) a. I presented Mary to herself.
 b. * I presented herself to Mary.

(Larson, 1988, p. 338, (5a))

- (11) a. I showed Mary herself.
 b. * I showed herself Mary.

(Larson, 1988, p. 336, (3a))

For the English DOC, Woolford (1993) observed that passivization is asymmetrical between the Recipient and the Theme: Only the Recipient can be passivized, as illustrated in the contrast between (12a) and (12b).

- (12) a. Pat was sent a letter. (Passivized Recipient)
 b. * A letter was sent Pat. (Passivized Theme)
- (Woolford, 1993, p. 685, (13))

3.2 Cantonese: Ditransitives and Passivization of the Double Object Construction

Cantonese and English are typologically very distant. With regard to ditransitives, Cantonese has the PDC pattern in (13), which demonstrates indirective alignment, just like the English PDC.

- (13) Zoengsaam sung-zuo bun syu bei Leisei. PDC [NP_{THEME} PP_{RECIPIENT}]
 Zoengsaam send-Perf Cl book BEI Leisei
 “Zoengsaam sent a book to Leisei.”

The morpheme preceding the Recipient argument is *bei*, which can be used as a verb, *bei* “give,” as illustrated in (14). There has been debate on the categorial status of *bei* in sentences like (14). Some researchers treat it as a verb (e.g., Matthews & Yip, 2011), while others treat it as a preposition (A. C. Chin, 2011; S.-W. Tang, 2003; Xu & Peyraube, 1997).

- (14) Zoengsaam bei-zuo jat-bun syu Leisei.
 Zoengsaam give-Perf one-Cl book Leisei
 “Zoengsaam gave Leisei a book.”

When the main verb is *bei* “give,” the post-VP *bei* is usually omitted, resulting in the [NP_{THEME} NP_{RECIPIENT}] order, as in (14), which is known in the literature as the “Inverted Double Object Construction” (S.-W. Tang & Cheng, 2014; Xu & Peyraube, 1997). According to S.-W. Tang and Cheng (2014), this construction is only limited to the verb *bei*.

S.-W. Tang and Cheng (2014) argued that Cantonese lacks the [NP_{RECIPIENT} NP_{THEME}] DOC construction, as illustrated by the ungrammaticality of (15).

- (15) * Keoi bei-zo ngo syu.
 3SG give-Perf 1SG book

(adapted from S.-W. Tang & Cheng, 2014, p. 609, (38))

However, in a study that employed acceptability judgment tasks, C. O. Chin (2009) found that 37% of Cantonese DOC sentences tested were rated as marginally or completely acceptable by 40 Hong Kong Cantonese native speakers who participated in the study. The author attributed the participants' acceptance of the DOC in Cantonese to influence from Mandarin.

Under the assumption that Cantonese lacks the DOC, it follows that there is no passivization pattern for it, either, as indicated by the ungrammaticality of (16) and (17).

- (16) * Leisei bei ren sung-zo bun syu. (Passivized Recipient)
 Leisei BEI people send-Perf Cl book
 "Leisei was sent a book by someone."

- (17) * Bun syu bei ren sung-zo Leisei. (Passivized Theme)
 Cl book BEI people send-Perf Leisei
 Literal: "* The book was sent Leisei by someone."
 Intended: "The book was sent to Leisei by someone."

3.3 Korean: Ditransitives and Passivization of the Double Object Construction

The Korean ditransitives exhibit two patterns that are distinguished by case marking: the [Dat-Acc] pattern instantiating indirective alignment and the [Acc-Acc] pattern instantiating neutral alignment. In (18), the Recipient *John* has the dative case marker *-eykey*; in (19), the Recipient has the accusative case marker *-ul*. The latter double accusative pattern is allowed with only a very small set of ditransitive verbs such as *cwu* "give" and *kaluchi* "teach" (e.g., Hong, 1992; Jung & Miyagawa, 2004; O'Grady, 1991); therefore, this pattern is not considered to be productive in Korean.

(18) Mary-ka John-eykey chayk-ul cwu-ess-ta. [Dat-Acc]
Mary-Nom John-Dat book-Acc give-Pst-Dec
“Mary gave a book to John.”

(adapted from Jung & Miyagawa, 2004, p. 108, (12a))

(19) Mary-ka John-ul chayk-ul cwu-ess-ta. [Acc-Acc]
Mary-Nom John-Acc book-Acc give-Pst-Dec
“Mary gave John a book.”

(adapted from Jung & Miyagawa, 2004, p. 108, (12a))

The status of the [Dat-Acc] pattern is a matter of ongoing debate. On the one hand, Oh (2010) treated the [Dat-Acc] pattern as the equivalent of the English DOC. According to her, this pattern is subject to the possession constraint just like the English DOC is. She argued that in the scenario in (20), the Recipient marked by dative case is odd because it is incompatible with the non-possession context.

(20) Scenario: John put a letter in the mail addressed to Mary, intending the letter to be read by Mary’s daughter, Nancy, and not by Mary.

John-un Mary-eykey pyenci-lul ponay-ss-ta.
John-Top Mary-Dat letter-Acc send-Pst-Dec
“John sent a letter to Mary.”

(Oh, 2010, p. 414, (18))

Moreover, Oh pointed out that the dative-marked Recipient asymmetrically c-commands the accusative-marked Theme, as illustrated in (21), which is another property shared with the English DOC.

- (21) a. John-i Mary-eykey kunyecasin-ul poyecwu-ess-ta. [Dat-Acc]
 John-Nom Mary-Dat herself-Acc show-Pst-Dec
 “John showed Mary herself.”
- b. * John-i kunyecasin-eykey Mary-lul poyecwu-ess-ta. [Acc-Acc]
 John-Nom herself-Dat Mary-Acc show-Pst-Dec
 “* John showed herself Mary.”

(Oh, 2010, p. 414, (17))

On the other hand, Kim (2015), following Jung and Miyagawa (2004), argued that the [Dat-Acc] pattern corresponds to the English PDC. In contrast to Oh’s claim, Kim maintained that the [Dat-Acc] pattern does not have a strong possessive implication. For example, the double accusative pattern in (22b) implies that students did acquire some knowledge of French, while this implication is relatively weak in the [Dat-Acc] pattern in (22a).

- (22) a. Hana-ka haksayngtul-eykey pwule-lul kaluchi-ess-ta. [Dat-Acc]
 Hana-Nom students-Dat French-Acc teach-Pst-Dec
 “Hana taught French to the students.”
- b. Hana-ka haksayngtul-ul pwule-lul kaluchi-ess-ta. [Acc-Acc]
 Hana-Nom students-Acc French-Acc teach-Pst-Dec
 “Hana taught the students French.”

(Kim, 2015, p. 31, (6))

Another piece of evidence supporting Kim’s PDC analysis comes from O’Grady (1991), who argued that the distribution of *-eykey* patterns like a postposition rather than a case marker. In other words, the Recipient in the Korean [Dat-Acc] pattern is marked with an adposition, just like in English. O’Grady provided two arguments to support the hypothesis that *-eykey* patterns like a postposition. First, *-eykey* can co-occur with a topic marker (see (23a)) or a delimiter (see (23b)), while case markers typically are not able to precede other postnominal particles.

- (23) a. John-eykey-nun nay-ka chayk-ul cwu-ess-ta.
 John-Dat-Top 1SG-Nom book-Acc give-Pst-Dec
 “As for John, I gave a book to (him).”
- b. Kay-eykey-man John-i mwul-li-ess-ta.
 dog-Dat-only John-Nom bite-Pass-Pst-Dec
 “John was bitten by only the dog.”

(O’Grady, 1991, p. 6, (1))

Second, *-eykey* resembles other postpositions in that its presence is always obligatory, unlike case suffixes, which are often optional.

- (24) John-i Sue-(*eykey) malhay-ss-ta.
 John-Nom Sue-(Dat) speak-Pst-Dec
 “John spoke to Sue.”

(O’Grady, 1991, p. 7, (2))

The debate on the status of the [Dat-Acc] pattern can perhaps be resolved if we consider the fact that it shares the same indirective alignment pattern with the English PDC. Therefore, I hypothesize that the [Dat-Acc] pattern is the equivalent of the English PDC in this study.

It should be noted that the order of the two arguments can alternate in the PDC in Korean, as shown in (25).

- (25) PDC word orders in Korean
- a. [PP_{RECIPIENT-Dat} NP_{THEME-ACC}]
 b. [NP_{THEME-ACC} PP_{RECIPIENT-Dat}]

The standard approach is to analyze (25a) as the canonical word order, and (21b) as the scrambled word order (e.g., Cho, 1994; Kim, 2008; D. Lee, 2004). In addition, Choi (2009) reported in a corpus study that the [PP_{RECIPIENT-Dat} NP_{THEME-ACC}] order is more frequent than the [NP_{THEME-ACC} PP_{RECIPIENT-Dat}] order. Choi (2007) also suggested that word/phrase length and information structure, as in many other phenomena, play a role in the alternation.

We now turn to passivization in the DOC for Korean. First, based on the alignment pattern, we will follow Kim (2015) in treating the double accusative pattern, which, you may recall, is limited to only a few ditransitive verbs, as the DOC. Jung and Miyagawa (2004) stated that Passivization of the Recipient is possible in the double accusative pattern, as in (26a), while passivization of the Theme is impossible, as illustrated in (26b).

(26) a. John-i (Mary-eyuyhay) chayk-i cwue-ci-ess-ta. (Passivized Recipient)
 John-Nom (Mary-by) book-Nom give-Pass-Pst-Dec
 “John was given a book (by Mary).”

(Jung & Miyagawa, 2004, p. 116, (28b))

b. * Chayk-i (Mary-eyuyhay) John-ul cwue-ci-ess-ta. (Passivized Theme)
 book-Nom (Mary-by) John-Acc give-Pass-Pst-Dec
 Literal: “* The book was given John (by Mary).”

Intended: “The book was given to John (by Mary).”

(adapted from Jung & Miyagawa, 2004, p. 116, (27b))

It is worth noting, however, that in (26a), the Theme *chayk-i* “book” is marked with nominative case. In contrast, O’Grady (1991) contended that Passivization of the Recipient is ungrammatical, and provided a passive example where the Recipient is marked with nominative case and the Theme is marked with accusative case, as in (27).

(27) * John-i yenphil-ul cwue-ci-ess-ta
 John-Nom pencil-Acc give-Pass-Pst-Dec
 Intended: “John was given a pencil.”

(adapted from O’Grady, 1991, p. 62, (3))

For the purpose of this study, the Korean verbs that were selected are not allowed in the double accusative construction in the first place, and so we assume that their passivization in the double accusative construction is ungrammatical too, just like in Cantonese.

3.4 Mandarin: Ditransitives and Passivization of the Double Object Construction

Mandarin allows three syntactic variants for ditransitives, as illustrated in (28). The [V NP_{RECIPIENT} NP_{THEME}] pattern, as in (28b), is generally treated as the DOC, and the [V-*gei* NP_{RECIPIENT} NP_{THEME}] pattern, in (28c), is called the “V-*gei* Double Object Construction.” However, there is no consensus on whether the [V NP_{THEME} *gei* NP_{RECIPIENT}] pattern, as in (28a), should be treated as the PDC, because there is ongoing debate regarding the categorial status of *gei* in post-VP position, since *gei* in other instances functions as a verb, as shown in (29).

- (28) a. Zhangsan song-le yi-ben shu gei Lisi. [V NP_{THEME} *gei* NP_{RECIPIENT}]
Zhangsan send-Perf one-Cl book GEI Lisi
“Zhangsan sent a book to Lisi.”
- b. Zhangsan song-le Lisi yi-ben shu. [V NP_{RECIPIENT} NP_{THEME}]
Zhangsan send-Perf Lisi one-Cl book
“Zhangsan sent Lisi a book.”
- c. Zhangsan song-gei-le Lisi yi-ben shu. [V-*gei* NP_{RECIPIENT} NP_{THEME}]
Zhangsan send-gei-Perf Lisi one-Cl book
“Zhangsan sent Lisi a book.”

- (29) Ta gei-le wo yi-ba jian.
3SG give-Perf 1SG one-Cl sword
“He gave me a sword.”

(C.-T. J. Huang, Li, & Li, 2009, p. 29, (46c))

C.-T. J. Huang et al. (2009) argued that *gei* in (28a) should be analyzed as a verb. First, they observed from the contrast between (30a) and (30b) that the *gei*-phrase is grammatical only in pre-verbal position. They claimed that the main verb *zuo* “do” enforces a benefactive reading on the *gei*-phrase, although they did not give an independent reason for why this is so. Note that at least in English, the verb *do* can impose a recipient reading on the nominal in the *to*-phrase as in *He did many things to me*.

- (30) a. Ta gei wo zuo-le henduo shi.
 3SG GEI 1SG do-Perf many thing
 “He has done many things for me.”
- b. *Ta zuo-le henduo shi gei wo.
 3SG do-Perf many thing GEI 1SG

(adapted from C.-T. J. Huang et al., 2009, p. 30, (50))

Nonetheless, the authors took the contrast between (30a) and (30b) to indicate that the post-VP *gei*-phrase, unlike the pre-verbal *gei*-phrase, is incompatible with a benefactive reading, because the post-VP *gei* is a verb that does not naturally have a benefactive interpretation. They also concluded that this is an expected result if we hypothesize that there is an independent requirement in Mandarin that a PP cannot occur after a verb in the same clause. However, C.-T. J. Huang et al. did not specify the type of projection in which the post-VP *gei*-phrase is located (a VP, a vP, a clause with a null subject, etc.).

Paul (2015) suggested that the ungrammaticality of sentences like (30b) is not related to the fact that the post-VP *gei*-phrase cannot have a benefactive reading. Instead, she argued that the sentence is ungrammatical because the verb *zuo* “do” is unable to select a Recipient PP as an argument. There is clear evidence, however, that the *gei*-phrase as a PP can have a recipient reading, because even C.-T. J. Huang et al. (2009) acknowledged the ambiguity of (31), in which the pre-verbal *gei*-phrase is considered a PP and the sentence can have either a recipient reading (see (31a)) or a benefactive reading (see (31b)).

- (31) Ta gei wo ji-le yi-zhang zhaopian.
 3SG to 1SG mail-Perf one-Cl picture
 a. “He mailed a picture to me.”
 b. “He mailed a picture for me.”

(adapted from C.-T. J. Huang et al., 2009, p. 31, (51))

Both Paul (2015) and Her (2006) argued against analyzing post-VP *gei* as a verb. Using very similar lines of argumentation, they each proposed that post-VP *gei* should be analyzed as a

preposition (but cf. Lin & Huang, 2015). They observed that post-VP *gei* is incompatible with aspect suffixes, as in (32).

- (32) Ta mai-le yi-ge shoubiao gei(*-le) Meili.
 3SG sell-Perf one-Cl watch to-Perf Meili
 “He sold a watch to Meili.”

(Paul, 2015, p. 75, (53a))

The (im)possibility of attaching aspect markers has been widely used as a test for verb-hood in Mandarin (e.g., C.-R. Huang & Ahrens, 1999; C.-R. Huang & Mangione, 1985; C.-C. J. Tang, 1990). However, it is not the case that all Mandarin verbs in all contexts can take an aspect marker. Mo, Huang and Chen (1991, as cited in C.-R. Huang & Ahrens, 1999) observed that Mandarin allows only the first verb in a serial verb construction (SVC) to be marked with an aspect marker when the SVC has a subordinate structure. Based on this observation, C.-R. Huang and Ahrens (1999) argued that the inability of *gei* in (32) to take an aspect marker can be explained by an analysis positing *gei* as a subordinate verb in an SVC.

Another piece of evidence that Paul (2015) offered for post-VP *gei* being a preposition is that the complement NP of *gei* cannot be moved to the topic position, as exemplified in (33a), in which case this would be just another instance of the impossibility of preposition stranding in Mandarin (see below). On the other hand, movement of the *gei*-phrase to sentence-initial position is grammatical, as shown in (33b).

- (33) a. * [TopP Meili_i, [TP wo mai-le yi-ge shoubiao [gei [e_i]]]].
 Meili 1SG sell-Perf one-Cl watch to

(Paul, 2015, p. 76, (55))

- b. Gei Meili, wo mai-le yi-ge shoubiao.
 for Meili, 1SG sell-Perf one-Cl watch
 “For Meili, I sold a watch.”

(adapted from Paul & Whitman, 2010, p. 265, (9a))

If post-VP *gei* is a verb, then the extraction of its argument should not result in ungrammaticality, because a true serial verb construction allows the object of the second verb to be topicalized (S. Zhang, 1990), as shown in (34).

- (34) Lisi_i, Zhangsan yao [*na* gunzi] [*da* [*e_i]].*
- Lisi, Zhangsan want use stick hit
- “Lisi, Zhangsan wanted to use a stick to hit.”

(S. Zhang, 1990, p. 314, (16a))

Alternatively, if post-VP *gei* is a preposition, then, as mentioned above, the ungrammaticality of (33a) simply results from the ban on preposition stranding in Mandarin (C.-T. J. Huang, 1982), as illustrated in (35), in which *dui* “to” is uncontroversially a preposition.

- (35) *Lisi_i, Zhangsan **dui** [*e_i] hen guanxin.*
- Lisi Zhangsan to very care
- Intended: “Lisi, Zhangsan cares much about [him].”

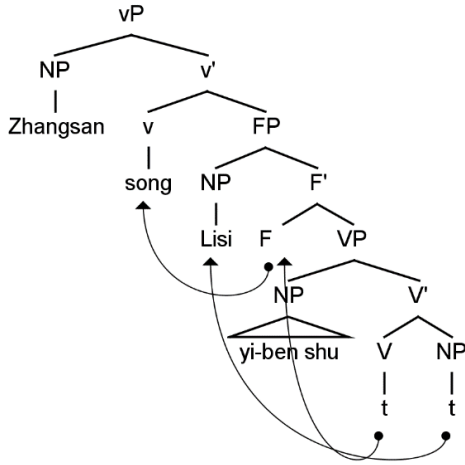
(Lin & Huang, 2015, p. 315, (9))

In light of the above considerations, the working hypothesis I adopt in this study is that the post-VP *gei* is a preposition and that the [V NP_{THEME} *gei* NP_{RECIPIENT}] pattern of (28a) is the Mandarin equivalent of the PDC. That said, whether L3 learners of Mandarin will treat the [V NP_{THEME} *gei* NP_{RECIPIENT}] pattern as the PDC, a PDC equivalent of the PDC in (one of) their previously-acquired grammars and exhibit transfer effects, is an empirical question.

We turn now to the DOC in Mandarin. As previously mentioned, in Mandarin—unlike in Cantonese (S.-W. Tang, 2003)—there exists a V-*gei* type of DOC (henceforth, “V-*gei* DOC”). Various syntactic analyses have been put forward to illustrate how the V-*gei* DOC and the DOC are related. For example, S.-W. Tang (2003) proposed that the V-*gei* DOC has an extra layer of functional structure (FP) between the vP and the VP, which is very similar to the idea of the ApplP in Bruening’s (2010) analysis of the English DOC (see (9b) in §3.1).

A DOC tree structure, based on S.-W. Tang (2003), is provided in (36); the Recipient NP originates in the complement position of the V and moves to the Spec of FP.

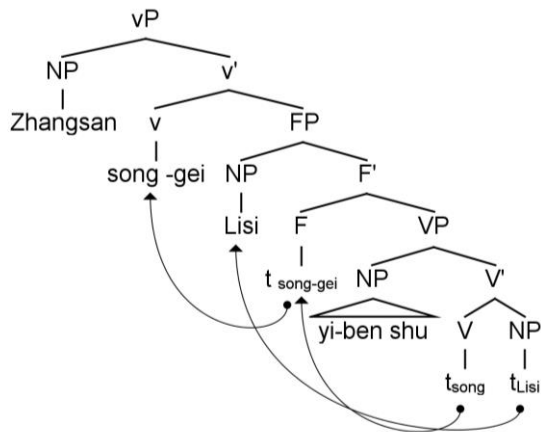
- (36) Zhangsan song Lisi yiben shu
 Zhangsan send Lisi one-Cl book
 “Zhangsan sent Lisi a book.”



(adapted from S.-W. Tang, 2003, p. 144, (53))

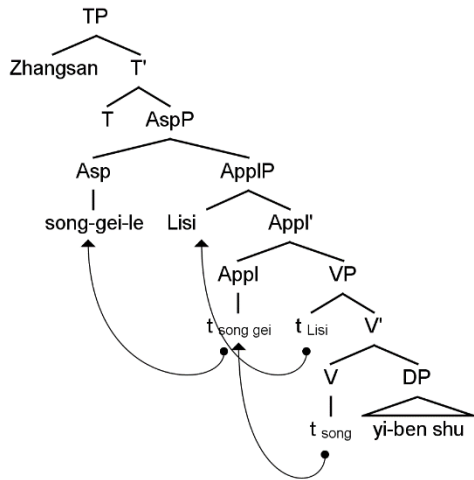
As for the V-*gei* DOC, S.-W. Tang (2003) further hypothesized that the (bound) *gei* particle is the overt realization of F. The derivation process is as follows: The V first moves to F, left adjoining to *gei* to form a compound verb V-*gei*, and then V-*gei* moves to v to form the V-*gei* DOC, as illustrated in (37).

- (37) Zhangsan song-gei Lisi yiben shu
 Zhangsan send-give Lisi one-Cl book



Similarly, Paul and Whitman (2010) posited that the Mandarin *V-gei* DOC has an ApplP headed by *gei*, which corresponds to S.-W. Tang’s FP (as in (37)). Accordingly, the tree structure for (28c) is (38).

- (38) Zhangsan song-gei-le Lisi yiben shu
 Zhangsan send-give-Perf Lisi one-CL book



(adapted from Paul & Whitman, 2010, p. 268, (18b))

In this analysis, the ApplP is above the VP (but see Kuo, 2016, who argues that the ApplP originates under the VP). The Recipient argument is base-generated in [Spec, VP] and later raises to [Spec, ApplP]; this is different from S.-W. Tang’s (2003) proposal for the *V-gei* DOC in which the Recipient argument is base-generated as the complement of V (see (37)).

D. Zhu (1980) observed that the *V-gei* DOC is closely related to the Mandarin DOC without *gei*. In general, all the DOCs (without *gei*) in which the verb denotes transfer of an entity can be used in the *V-gei* DOC, as illustrated in (39).

- (39) Zhangsan mai-(gei)-le wo yi-ben shu.
 Zhangsan sell-(GEI)-Perf 1SG one-CL book
 “Zhangsan sold me a book.”

(adapted from S.-W. Tang, 2003, p. 153, (82))

In light of the above discussion of Mandarin, I will treat the DOC and the V-*gei* DOC as having the same underlying structure in this study. (Foreshadowing Chapter 5, I used the V-*gei* DOC for the experimental stimuli in Mandarin.⁸)

Let us now turn attention to Passivization of the DOC (without *gei*) and Passivization of the V-*gei* DOC. It is worth noting that there are two types of Mandarin passives: long passives and short passives (C.-T. J. Huang et al., 2009). The difference is that the latter lacks an NP (usually the Agent) after the passive marker *bei*. This study will focus on long passives only. It is generally agreed that only the Theme argument is eligible for passivization in Mandarin (C.-R. Huang, 1993; Liu, 2006; Paul & Whitman, 2010); relevant examples are given in (40). In (40c), the passivized Theme in subject position is definite (*nei-ben shu* “that book”), while the Theme in active (40a) is indefinite (*yi-ben shu* “one book”). If one tries to passivize an indefinite Theme, it results in ungrammaticality. This is due to the definiteness/specificity requirement for subjects and topics in Mandarin (see Cheng & Sybesma, 1999; Hsin, 2002; Tsai, 2001).

- (40) a. Wo song-le Lisi yi-ben shu. (Active voice DOC)
 1SG send-Perf Lisi one-CL book
 “I sent Lisi a book.”
- b. *Lisi bei wo song (gei)-le yi-ben shu. (Passivized Recipient)
 Lisi BEI 1SG send (GEI)-Perf one-CL book
 “Lisi was sent a book by me.”
 (adapted from C.-R. Huang, 1993, p. 14, (18b))
- c. Nei-ben shu bei wo song (gei)-le Lisi. (Passivized Theme)
 that-CL book BEI 1SG send (GEI)-Perf Lisi
 Literal: “* That book was sent Lisi by me.”
 Intended: “That book was sent to Lisi by me.”
 (adapted from C.-R. Huang, 1993, p. 14, (18c))

⁸ This was primarily done to accommodate Mandarin native speakers’ judgments of Passivization of the Theme. A pilot study revealed that Mandarin native speakers gave low ratings to Passivization of the Theme in the DOC without *gei*, even though this pattern is said to be grammatical in the literature (e.g., C.-R. Huang, 1993; Liu, 2006). When Passivization of the V-*gei* DOC was tested in another pilot study, the ratings were much higher. Moreover, in order to have as minimal a pair as possible between the active DOC and Passivization in the DOC, the V-*gei* DOC was chosen.

It is worth acknowledging that there is an unresolved debate in the literature concerning the underlying structure of the long passive in Mandarin. One line of research maintains that the Mandarin long passive is derived from the corresponding active sentence by A-movement, like English passives are (e.g., Li, 1990; Wang, 1970); another line of research rejects such movement and posits that the Mandarin long passive is formed by VP complementation, in which *bei* is analyzed as a matrix verb that takes an embedded clause (e.g., Hashimoto, 1978, 1987). Yet another analysis comes from Feng (1997); this one hypothesizes that Mandarin long passives are formed like the English *tough*-construction, which (under one influential account) involves movement of a null operator and predication (Chomsky, 1981). C.-T. J. Huang et al. (2009) evaluated the arguments and problems for the three approaches and concluded that Feng's (1997) proposal "has the virtues of both the movement analysis and the complementation analysis, but none of their problems" (p. 121). Regardless of the structure of Mandarin passives, whether L3 learners of Mandarin will map the Mandarin DOC passive to the English DOC passive remains an empirical question. For passivization of the DOC in L3 Mandarin, if we find evidence of transfer from the English DOC passive, it will suggest that L3 learners do treat (long) passives in the two languages as equivalents. If we fail to find evidence of such transfer, I will entertain the possibility that the L3 learners may not treat passives in Mandarin as the equivalent of passives in English, possibly because of the different structure of passives in these two languages.

3.5 Summary

The relevant crosslinguistic differences for English, Cantonese, Korean, and Mandarin are summarized in Table 2. In order for us to test for transfer effects in L3 acquisition, the L1–L2 language pairs need to differ in terms of the linguistic properties under investigation. Cantonese and English are one of the targeted L1–L2 pairs in this study; it is clear from Table 2 that Cantonese differs from English in regard to the acceptability of both the DOC and Passivization of the Recipient in the DOC. In the second L1–L2 pair in this study, i.e., Korean and English, Korean differs from English with respect to the acceptability of the DOC, the Reverse PDC, and Passivization of the Recipient in the DOC.

Table 2**Similarities and Differences Among English, Cantonese, Korean, and Mandarin**

	DOC	PDC	Reverse PDC^a	POR	POT
English (L2)	✓	✓	x	✓	x
Cantonese (L1)	x	✓	x	x	x
Korean (L1)	x ^b	✓	✓	x	x
Mandarin (L3)	✓	✓	x	x	✓

Note. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

^aThe Reverse PDC refers to the V + PP_R + NP_T pattern, which corresponds to the canonical [PP_{RECIPIENT}-Dat NP_{THEME}-Acc] construction in Korean.

^bThis pattern is possible with only a very limited number of verbs.

The next chapter reviews the most pertinent studies on the acquisition of ditransitives by non-native speakers of English and Mandarin, since the L3 participants in this dissertation research had English as their L2 and Mandarin as their L3.

Chapter 4. The L2 Acquisition of Ditransitives in Mandarin and English

To the best of my knowledge, no Mandarin research has been conducted on the L3 acquisition of ditransitives or on Passivization of the Recipient and Theme in the Double Object Construction (DOC). Moreover, only a few studies have looked at the L2 acquisition of ditransitives in Mandarin, and no study has looked at the L2 acquisition of Passivization of the Recipient or Theme in the Mandarin DOC. In contrast, a lot of studies have investigated the L2 acquisition of the dative alternation in English. In this chapter, I review the three previous studies on the L2 acquisition of ditransitives in Mandarin as well as a few studies on the L2 acquisition of ditransitives in English that are most relevant to the current study.

4.1 Ditransitives in L2 Mandarin

4.1.1 Chang (2014)

Chang's (2014) study was the first to examine the L2 acquisition of the Chinese dative alternation (PDC vs. DOC) by native speakers of English or French. This study categorized ditransitive verbs into four types based on their behavior in English and Mandarin (note that French allows only the PDC), as summarized in Table 3.

Table 3

Verb Categories and Their Behavior in English and Mandarin in Chang (2014)

	English	Mandarin	Examples
Type 1	<i>to</i> -dative & DOC	PDC (only for some verbs); DOC	<i>offer</i> “tigong,” <i>owe</i> “qian”
Type 2	<i>to</i> -dative & DOC	PDC only	<i>bring</i> “dai,” <i>hand</i> “chuandi”
Type 3	<i>for</i> -dative & DOC	PDC only	<i>book</i> “yuding,” <i>choose</i> “xuanze”
Type 4	Neither <i>to</i> -dative nor DOC	PDC & DOC	<i>bestow</i> “shang,” <i>remind</i> “tixing”

Type 1 verbs alternate between the (*to*-dative) PDC and the DOC in English, while their Mandarin analogues can all appear in the DOC but only a subset can appear in the PDC. Type 2 verbs are those which alternate between the DOC and the (*to*-dative) PDC in English but appear only in the PDC in Mandarin. Type 3 verbs alternate between the (*for*-dative) PDC and the DOC

in English but only in the PDC in Mandarin. Type 4 verbs alternate between the DOC and the PDC in Mandarin, but in English they are not allowed in either the DOC or the (*to*-dative) PDC.

Chang used language samples written by intermediate to advanced (L1-English or L1-French) L2ers of Mandarin from the HSK⁹ Composition Corpus (B. Zhang, 2009). He extracted all the sentences in the corpus containing the four types of ditransitive verbs. He found that both L1-English L2ers and L1-French L2ers were able to use ditransitive verbs in a target-like manner, even in cases when the verb's behavior differs between the L1 and Mandarin. For example, Type 2 verbs like *dai* ("bring") can appear only in the PDC condition in Mandarin, as illustrated in (41), but its English equivalent "bring" can alternate between the PDC and the DOC. If the L2ers transferred their L1 English grammar into Mandarin, we would expect DOC errors like *Zhangsan dai-le Lisi liwu* in the corpus; however, such errors were non-existent. All 46 instances containing any of the five Type 2 verbs produced by L1-English L2ers were PDC sentences ($k = 1$) or sentences of other legitimate constructions ($k = 45$), like the *ba*-construction.

- (41) Zhangsan dai-le liwu gei Lisi.
Zhangsan bring-Perf gift to Lisi
"Zhangsan brought a gift to Lisi."

Moreover, 112 of the 127 sentences (88.2%) that contained the six Type 1 verbs produced by L1-English L2ers were DOC sentences. Three of the Type 1 verbs alternate between the DOC and PDC in Mandarin (*jiao* "teach," *song* "send", and *tigong* "offer"), while the other three are allowed only in the DOC in Mandarin (*gaosu* "tell," *gei* "give," and *wen* "ask"). Again, no ungrammatical PDC sentences were found for the three Type 1 verbs that can appear in the English PDC, but not the Mandarin PDC.

In other words, Chang did not find evidence of non-facilitative L1 transfer (see fn. 5), probably due at least in part to the high proficiency of the L2ers. One major limitation of this study is that the sample size was very small: Only about 200 sentences that contained 14 different ditransitive verbs were found in the corpus. Presumably, this is because the composition topics did not provide particularly felicitous contexts for ditransitives.

⁹ HSK stands for *Hanyu Shuiping Kaoshi* "Chinese Proficiency Test."

4.1.2 Y. Zhu and Zhao (2016)

Y. Zhu and Zhao (2016) investigated whether L1-English and L1-Japanese L2ers of Mandarin can acquire the semantic constraints on verbs that can occur in the Mandarin PDC and DOC. They followed D. Zhu (1980) and B. Zhang (1999) in categorizing Chinese ditransitive verbs into six categories based on their semantic properties, as laid out in Table 4.

Table 4
Verb Categories and Their Behavior in the Mandarin PDC and DOC (adapted from Y. Zhu & Zhao, 2016, p. 59, Table 1)

Verb semantics	PDC	DOC	Examples
<i>dao</i> “pour”	✓	x	<i>dao</i> “pour”
<i>ji</i> “mail”	✓	x	<i>ji</i> “mail”
<i>qude</i> “get”	✓	✓	<i>mai</i> “buy”
<i>song</i> “send”	✓	✓	<i>song</i> “send”
<i>xinxi</i> “communicate”	x	✓	<i>gaosu</i> “tell”
<i>zhizuo</i> “make”	✓	x	<i>zuo</i> “make”

Among these six types of verbs, five (“pour”-type, “mail”-type, “get”-type, “send”-type, “make”-type) can occur in the Mandarin PDC and only three (“get”-type, “send”-type, “communicate”-type) can occur in the Mandarin DOC. English differs from Mandarin on the types of verbs that are allowed in the DOC. According to the authors, “make”-type verbs in English are allowed in the DOC, such as *He drew me a picture*. However, this generalization has exceptions. For example, **John created Mary some toys* is ungrammatical. In addition, few English “get”-type verbs can appear in the DOC, except for “fine” and “charge,” while Mandarin verbs like *tou* “steal” and *qiang* “rob” can appear in the DOC. The authors claimed that the corresponding Japanese sentences allow all six types of verbs in only the DOC.¹⁰

The study had 40 L1-English L2ers, 40 L1-Japanese L2ers, and 20 Mandarin native speakers complete an acceptability judgment task (AJT) and a sentence-formation task. For each L1, half of the L2ers were at the intermediate level and the other half at the advanced level (as measured by a Mandarin cloze test the authors created). For the AJT, two verbs in each of the six categories were presented in both PDC sentences and DOC sentences, for a total of 24 critical

¹⁰ The authors did not provide a citation for this statement.

items. There were also eight filler items. In the AJT, participants were asked to rate the sentences on a 5-point scale, with “-2” standing for *wanquan bujieshou* “completely unacceptable,” “-1” standing for *jiben bujieshou* “basically unacceptable,” “0” standing for *wufa panduan* “I can’t judge,” “1” standing for *jiben jieshou* “basically acceptable,” and “2” standing for *wanquan jieshou* “completely acceptable.”

The results on the PDC (see Table 5) showed that all four L2 groups rejected the PDC with “communicate”-type verbs, which is a judgment in line with the target language. Moreover, all L2 groups except the L1-English advanced group had significantly lower ratings than the native control group on the PDC sentences for “get”-type verbs. For the other four types of verbs, the different L2 groups had different patterns of judgments. Japanese L2ers tended to reject the PDC for all types of verbs (except for the “make”-type), while the English L2ers, especially those at advanced level, tended to accept the PDC for all four types of verbs (except for the intermediate L2ers who tended to reject it for the “mail”-type verbs).

Table 5
Mean Ratings on the PDC by Condition and Group (adapted from Y. Zhu and Zhao, 2016, p. 62, Table 5)

Verb semantics	L1-English		L1-Japanese		Native Mandarin
	Intermediate	Advanced	Intermediate	Advanced	
<i>dao</i> “pour”	0.43***	1.28	-0.41***	0.50***	1.93
<i>ji</i> “mail”	-0.33***	0.53**	-0.23***	-0.13***	1.78
<i>qude</i> “get”	0.05***	1.03	-0.32***	-0.35***	1.85
<i>song</i> “send”	0.1***	0.65**	-0.65***	-0.20***	1.80
<i>xinxi</i> “communicate”	-1.27	-1.40	-1.15	-1.12	-0.85
<i>zhizuo</i> “make”	0.67*	0.95	0.03***	0.48**	1.78

Note. Significant differences between an L2 group and the Mandarin controls are indicated by asterisks: * = $p < .05$; ** = $p < .01$; *** = $p < .001$.

The mean ratings on the DOC are displayed in Table 6. In general, advanced-level L2ers had more target-like performance than the corresponding intermediate-level L2ers did. For the “get”-type verbs, all L2 groups had significantly lower ratings than the native control group on the DOC sentences. Japanese L2ers differed from English L2ers in their DOC judgments on “mail”-type and “send”-type verbs. On the one hand, English L2ers rejected the DOC “mail”-type verbs and their ratings did not differ significantly from those of the native speakers,

while the Japanese learners, especially those at the intermediate level, tended to accept the DOC “mail”-type verbs, and their ratings were significantly higher than those of the native speakers. On the other hand, Japanese L2ers gave high ratings for the DOC “send”-type verbs and their ratings were not significantly different from those of the native speakers, while the English L2ers gave ratings that were significantly lower from those of the native speakers on this verb type.

Table 6
Mean Ratings on the DOC by Condition and Group (adapted from Y. Zhu and Zhao, 2016, p. 62, Table 4)

Verb semantics	L1-English		L1-Japanese		Native Mandarin
	Intermediate	Advanced	Intermediate	Advanced	
<i>dao</i> “pour”	0.35***	-0.22**	0.07***	-0.98	-1.53
<i>ji</i> “mail”	-0.32	-0.28	0.75***	-0.05*	-1.10
<i>qude</i> “get”	-0.25***	-0.23***	0.00***	-0.33***	1.57
<i>song</i> “send”	0.30***	0.83***	1.40	1.30	1.90
<i>xinxi</i> “communicate”	1.65	1.57	1.75	1.60	1.95
<i>zhizuo</i> “make”	-0.25**	-0.62*	-0.05***	-1.20	-1.65

Note. Significant differences between an L2 group and the Mandarin controls are indicated by asterisks: * = $p < .05$; ** = $p < .01$; *** = $p < .001$.

In the sentence-formation task, participants were presented with groups of words and asked to judge whether all and only the given words could be used to form a “grammatical” sentence. The construction tested in this task was restricted to the DOC; the verbs (two per type) were the same as those in the AJT. Some groups of words contained a verb that can occur in the DOC, such as *huan* “return” (“send”-type) in (42a), while in others there was a verb that cannot occur in the DOC, such as *pao* “brew” (“pour”-type) in (42b).

- (42) a. Xiaoming yi-ben huan-le Dawei shu
 Xiaoming one-CL return-Perf David book
- b. *mama pao-le cha keren
 mother brew-Perf tea guest

In cases where participants believed that the given group of words could be used to form a “grammatical” sentence, they were also asked to write down the sentence. For example, the

words in (42a) can be used to form the DOC sentence *Xiaoming huanle Dawei yiben shu*, whose literal gloss is * “Xiaoming returned David a book.”

Participants’ performance on this task (see Table 7) mostly mirrored their performance on the AJT: All L2 groups had their highest accuracy rates on “communicate”-type verbs (ranging from 85% to 98%, depending on the group, e.g., advanced L2ers had slightly higher accuracy than intermediate L2ers, and L1-Japanese L2ers had slightly higher accuracy than L1-English L2ers, and there was no interaction between L1 and proficiency level). All L2 groups had their lowest accuracy rates on “get”-type verbs (ranging from 23% to 38%).

Table 7

Accuracy Rates by Condition and Group in the Sentence-Formation Task (adapted from Y. Zhu and Zhao, 2016, p. 63, Table 7)

Verb semantics	L1-English		L1-Japanese		Native Mandarin
	Intermediate	Advanced	Intermediate	Advanced	
<i>dao</i> “pour”	45%	63%	53%	93%	88%
<i>ji</i> “mail”	60%	63%	53%	70%	90%
<i>qude</i> “get”	25%	38%	35%	23%	98%
<i>song</i> “send”	55%	50%	78%	70%	93%
<i>xinxi</i> “communicate”	85%	90%	93%	98%	100%
<i>zhizuo</i> “make”	73%	90%	68%	95%	98%

The authors stated that the results from the two tasks could be partially explained by L1 transfer. For example, the advanced L1-English L2ers gave high ratings that were not significantly different from those of the native Mandarin speakers for three types of verbs that can occur in the PDC (i.e., “pour”-type, “get”-type, and “make”-type—see Table 4), because English has the PDC, whereas the advanced L1-Japanese L2ers gave low ratings for all verb types in the PDC, because Japanese lacks such a pattern. The authors also pointed out that it is not the case that L1 transfer can explain all of the performance of the L2ers. For example, English allows “mail”-type and “make”-type verbs in the DOC (whereas “mail”-type and “make”-type verbs are not allowed in the Mandarin DOC—see Table 4), but the L1-English groups’ mean ratings on these two types of verbs in the Mandarin DOC were low. The limitation of this argument is that the authors took the absence of evidence of transfer as evidence of the absence of transfer; it is of course possible that at the time of testing, these L2ers had already

acquired the impossibility of “mail”-type and “make”-type verbs occurring in the Mandarin DOC, since they had been learning Mandarin in China for at least 14 months and had reached at least intermediate proficiency in Mandarin. Another limitation of this study is that the authors looked at only group results; that is, they did not do any analyses by individual. Since group ratings in both tasks fell toward the middle point in a number of conditions, it is very likely that there was inter-participant variation within groups.

4.1.3 Yang and Luo (2017)

The most recent study on the Mandarin ditransitive construction was conducted by Yang and Luo (2017), examining 20 L1-English L2ers and 20 Mandarin heritage learners whose other language is English. Although no proficiency test was administered to participants, all were taking third-year Mandarin classes at American universities at the time of testing.

The experimental materials consisted of a translation task and an AJT. In the translation task, participants were asked to translate five English sentences, listed in Table 8, into Mandarin. Three ditransitive verbs were used: *give*, *tell*, and *explain*. Both *give* and *tell* are alternating verbs, while *explain* can occur only in the PDC. Note that in Mandarin, the analogues of *give* (*gei*) and *tell* (*gaosu*) occur only in the DOC and that neither the PDC nor the DOC is possible for the analogue of *explain* (*jieshi*).

Table 8

English Sentences from the Translation Task in Yang and Luo (2017)

Verb	Type in English	Sentences
Give	Alternating	I gave him a book. I gave a book to him.
Tell	Alternating	I told them the truth. I told the truth to them.
Explain	PDC only	I explained the story to him.

The results showed that both L2ers and heritage learners correctly translated the English *give* DOC sentence into the corresponding Mandarin DOC sentence. For the *give* PDC sentence, most of the learners translated it as either a DOC sentence or a *ba*-sentence, probably because in Mandarin it is unnatural to use the verb *gei* “give” in the PDC; nonetheless, two of the L2ers used the PDC when translating it into Mandarin, i.e., ?? *wo gei-le yiben shu gei ta*, which is

suggestive of L1 influence. Both groups of learners made more errors in the *tell* and *explain* sentences, especially in cases where there was no corresponding Mandarin construction. For example, in English, the verb *tell* alternates between the PDC and the DOC, but in Mandarin *gaosu* “tell” can occur only in the DOC. Six of the 20 L2ers translated the PDC *tell* sentence into a PDC sentence, 10 into a DOC sentence or some other patterns, such as a *ba*-sentence, and four made word-order errors (* *wo gaosu-guo zhenli tamen*; literally, * “I told the truth them.”) or vocabulary errors (* *wo bu huangyan tamen*; literally, * “I not lie them”). The highest error rate (almost 50%) for both groups of learners came in translating the *explain*-sentence, presumably because Mandarin *jieshi* “explain” cannot occur in the PDC (while English *explain* can). One of the errors participants made for this sentence was to translate it into the PDC, which can again be attributed to L1 transfer.

Although Yang and Luo believed that the translation task is useful as a test of the production of the PDC and the DOC, they acknowledged that it may not be an adequate measure of grammatical knowledge because participants can use avoidance strategies to circumvent the target constructions. Therefore, the authors’ inclusion of an AJT is more likely to help reveal learners’ knowledge of Mandarin ditransitives. The stimuli for the AJT consisted of five types of verbs, the categorization criterion being the construction type(s) in which a given Mandarin verb can appear: (a) PDC-only verbs; (b) DOC-only verbs; (c) PDC–V-*gei* DOC alternating verbs; (d) DOC–V-*gei* DOC alternating verbs; and (e) PDC–DOC–V-*gei* DOC alternating verbs. Examples of each verb type are given in (43).

- (43) a. wo song-le yiben shu gei ta. (PDC)
 I send-Perf one-CL book to him
 “I sent a book to him.”
- b. wo song-le ta yiben shu. (DOC)
 I send-Perf him one-CL book
 “I sent him a book.”
- c. wo song-gei-le ta yiben shu. (V-*gei* DOC)
 I send-give-Perf him one-CL book
 “I sent him a book.”

There were two verbs per verb type, and all the verbs were presented (only once) in the PDC, DOC and *V-gei* DOC patterns. The participants were asked to judge whether a sentence is “grammatical” or not, and they needed to correct the sentence if deemed “ungrammatical.” For scoring, a target-like judgment received one point and a non-target-like judgment received zero points. A list of the target verbs and their grammaticality in the different sentence patterns in Mandarin and English are given in Table 9. Yang and Luo did not provide the English analogues of the Mandarin verbs they used in the study. Some of the Mandarin verbs do not have a one-word equivalent in English, like *zhao* “give change.” It is unclear how the comparison of grammaticality between Mandarin and English verbs was made.

Table 9

Verbs Used in Yang and Luo (2017)

Verb type	Verb	Sentence pattern	Grammaticality in Mandarin	Grammaticality in English
PDC-only	mai “buy”	PDC	✓	✓
		DOC	x	✓
		V- <i>gei</i> DOC	x	x
	zao “create”	PDC	✓	✓
		DOC	x	✓
		V- <i>gei</i> DOC	x	x
DOC-only	wen “ask”	PDC	x	x
		DOC	✓	✓
		V- <i>gei</i> DOC	x	x
	gaosu “tell”	PDC	x	✓
		DOC	✓	✓
		V- <i>gei</i> DOC	x	x
PDC–V- <i>gei</i> DOC	da “dial (the phone number)” ^b	PDC	✓	✓
		DOC	x	x
		V- <i>gei</i> DOC	✓	x
	diu “throw”	PDC	✓	✓
		DOC	x	x
		V- <i>gei</i> DOC	✓	x
DOC–V- <i>gei</i> DOC	shao “owe”	PDC	x	x
		DOC	✓	✓
		V- <i>gei</i> DOC	✓	x
	jiao “teach”	PDC	x	x
		DOC	✓	✓
		V- <i>gei</i> DOC	✓	x
Three ^a	song “send”	PDC	✓	✓
		DOC	✓	✓
		V- <i>gei</i> DOC	✓	x
	zhao “give change” ^c	PDC	✓	✓
		DOC	✓	✓
		V- <i>gei</i> DOC	✓	x

The blue highlighting marks difference in grammaticality between Mandarin and English.

^a “Three” stands for PDC–DOC–V-*gei* DOC alternating verbs.

^b *da* as in *Zhangsan dale yige dianhua gei Lisi*. “Zhangsan gave a phone call to Lisi.” The English translation is mine.

^c *zhao* as in *Zhangsan zhao Lisi sankuai qian*. “Zhangsan gave Lisi three dollars’ change.” The English translation is mine.

Yang and Luo found, as shown in Figure 3, that the learners' mean accuracy scores varied across the different verb types.¹¹ Note that for the DOC-only and the PDC-only verbs, one-third of the items were intended to be acceptable, while the other two-thirds of the items were unacceptable. For the PDC–V-*gei* DOC alternating and DOC–V-*gei* DOC alternating verbs, two-thirds of the items were intended to be acceptable and the other one-third of the items were unacceptable. For the PDC–DOC–V-*gei* DOC alternating verbs, all items were intended to be acceptable. The authors analyzed the data exclusively on accuracy, so we don't know how performance varied as a function of (un)acceptability.

The L2ers scored significantly higher for the DOC-only and PDC–DOC–V-*gei* DOC alternating types than for the other types. Specifically, the L2ers had their highest mean accuracy score in the DOC-only type (around 0.78), followed by the PDC–DOC–V-*gei* alternating type ($M = 0.55$). The authors attributed the L2ers' high score for the DOC-only verbs to L1 transfer because this verb type had the smallest number of grammaticality mismatches between Mandarin and English (e.g., ungrammatical PDC in Mandarin but grammatical PDC in English, see Table 9).

Moreover, Yang and Luo found that different verbs also received different judgments depending on (mis)match between Mandarin and English. For example, the DOC-only type consisted of *wen* “ask” and *gaosu* “tell.” Six more L2ers accepted the ungrammatical PDC sentence with *gaosu* than with *wen*, presumably because English *ask* (like its Mandarin equivalent) can be used only in the DOC, while English *tell* (unlike its Mandarin equivalent) can alternate between the PDC and the DOC.

In addition to L1 transfer, the authors also argued that extent of familiarity with the verbs in the experiment played a role in the judgments, i.e., more familiar verbs were judged in a more target-like manner. They did not, however, define exactly what they meant by “familiarity,” much less test for it. An arguably more important shortcoming of the study is methodological: There was only one token per sentence type for each verb. It is also unclear whether any filler items were included in the task.

To summarize, three studies examining the L2 acquisition of Mandarin ditransitive constructions have been reviewed. Chang (2014) was a corpus study, while the other two were

¹¹ The data showed that the heritage learners had significantly higher accuracy than the L2ers did; since the interest of this dissertation research does not include heritage learners, no more will be said about this group's results.

experimental studies. The studies by Y. Zhu and Zhao (2016) and by Yang and Luo (2017) made use of acceptability judgment tasks. There is one notable difference in the findings of these two studies: In Y. Zhu and Zhao's AJT, L1-English L2ers' performance on the verb *gaosu* "tell" was target-like in the PDC (i.e., the mean rating on the ungrammatical use of *gaosu* in the PDC was -1.27 for intermediate learners and -1.40 for advanced learners), while in Yang and Luo's study, eight out of 20 L1-English L2ers gave non-target-like judgments for the equivalent condition (i.e., they accepted the ungrammatical PDC with *gaosu*). Yang and Luo attributed this relatively high error rate in their study to L1 transfer. Y. Zhu and Zhao, by contrast, reported that L1 transfer was not detected. However, Y. Zhu and Zhao did not conduct any analyses by individual, so it could be the case that inter-participant variation was masked by the group mean results. This contrast demonstrates the importance of conducting individual analyses.

4.2 Ditransitives in L2 English

In contrast to the scarce research on the L2 acquisition of Mandarin ditransitives, many studies have looked at the L2 acquisition of the dative alternation in English from various perspectives. Some have focused on L1 transfer and the learnability problem related to learning the constraints on the PDC and the DOC, including the possession constraint on the DOC (e.g., Bley-Vroman & Yoshinaga, 1992; Oh, 2010; Whong-Barr & Schwartz, 2002; Yang & Montrul, 2017; Yook, 2012); others have focused on investigating the role multiple factors play in L2ers' choice between the DOC and the PDC with alternating verbs, such as accessibility of the Recipient and/or Theme, animacy of the Recipient, information structure, pronominality of the Recipient and/or Theme, etc. (e.g., Gries & Deshors, 2015; Y. Lee, Yook, Lee & Park, 2015; K.-S. Park, 2014). A comprehensive overview of the L2 acquisition of the English dative alternation is beyond the scope of this dissertation, since the focus of the current study is on L3 Mandarin, not L2 English. Nonetheless, all L3ers of Mandarin in this study do have English as their L2. For the purpose of determining the source of transfer, it is important to know what the L3ers' L2-Interlanguage grammars look like regarding the linguistic phenomena under investigation. I will review three studies examining adult Korean and Mandarin L2ers' acquisition of English ditransitives that have implications with regard to L1 transfer.

4.2.1 Oh (2010)

Oh (2010) examined the acquisition of the English DOC by L1-Korean speakers, focusing on two kinds of DOC: the Benefactive (*for*) DOC, as in (44a), and the Goal (*to*) DOC, as in (44b).

- (44) a. John baked Mary a cake. Benefactive DOC
b. John gave Mary a book. Goal DOC

(adapted from Oh, 2010, p. 409, (1))

Oh argued that the Korean Goal DOC shares similar grammatical properties with the English Goal DOC, but that the Korean Benefactive DOC is different from its English counterpart in that it is marked with a light verb *cwu*- “give,” as shown in (45).¹²

- (45) John-i Mary-eykey kheyikhu-lul kwuwe * (cwu)-ess-ta.
John-Nom Mary-Dat cake-Acc bake (Ben)-Past-Dec
“John baked Mary a cake.”

(adapted from Oh, 2010, p. 415, (20))

Oh hypothesized that verbs that appear in the Korean Benefactive DOC are transitive verbs that take an accusative-marked argument and that the light verb *cwu*- “give” licenses the dative-marked argument. English benefactive-verbs, on the other hand, are ditransitive verbs that license two arguments, i.e., the Recipient and the Theme. Moreover, the English Benefactive DOC is subject to the possession constraint (see §3.1), while the Korean Benefactive DOC is not.

In light of the assumed analytical differences between the Korean and English Benefactive DOCs, Oh asked two research questions. First, will native Korean speakers show L1 transfer effects and manifest knowledge of the possession constraint of the English Goal DOC before that of the Benefactive DOC, because the Korean Goal DOC is subject to the possession constraint but the Korean Benefactive DOC is not? Second, if there is non-facilitative transfer from the L1, can Korean L2ers of English recover from it?

¹² As mentioned in Chapter 3, Oh (2010) considered the [Dat-Acc] pattern as the equivalent of the English DOC, which is different from the analysis adopted for the research of this dissertation.

Oh used an AJT to test 33 L1-Korean L2ers of English, whose English proficiency ranged from beginning to advanced level as measured by an English cloze test. The test stimuli, all in the DOC, consisted of three benefactive-verbs and three goal-verbs, all appearing in two contexts: One satisfies the possession constraint (i.e., [+Poss]), the other does not (i.e., [-Poss]). Sample items for a benefactive-verb and a goal-verb are provided in (46) and (47), respectively.

(46) Sample item with a benefactive-verb, *find*

a. [+Poss] context

Rodney was looking for an apartment, but he didn't know the area well, so even after weeks of looking, he didn't see any that he wanted to live in. Finally, he asked his friend Heather to help him look, because he knew she used to be a realtor. Within the week, Heather had one that Rodney liked.

Heather found Rodney an apartment. 1 2 3 4 Not sure

b. [-Poss] context

Betty's company hired a consultant for a month, and Betty needed to find somewhere for the consultant to stay, but after looking in all the papers, she couldn't find anything. Finally, she asked Peter to help her since she knew Peter knew a lot of the landlords. Within the week, Peter had one that Betty liked. Now the consultant has a place to stay!

Peter found Betty an apartment. 1 2 3 4 Not sure

(47) Sample item with a goal-verb, *bring*

a. [+Poss] context

Danielle was just starting out as an accountant, and need new clients. Her friend, Alex was an accountant across town, and he was thinking of leaving the company he was in. He decided to join Danielle's new company, and many of his clients followed him to Danielle's company. Now Alex's clients became the clients of Alex and Danielle.

Alex brought Danielle new clients. 1 2 3 4 Not sure

b. [-Poss] context

Olive went to the doctor's office yesterday. She wasn't sick herself: she came because one of the children that she was baby-sitting got sick. He had a really bad tummy-ache!

Olive brought the doctor a child. 1 2 3 4 Not sure

The results showed that on average, beginning learners rejected both the Goal DOC and the Benefactive DOC in the two contexts. The intermediate and advanced learners accepted the Goal DOC only in the [+Poss] context but not in the [-Poss] context, which is target-like. In contrast, the intermediate learners did not accept the Benefactive DOC in either context; only the advanced learners accepted the Benefactive DOC in the [+Poss] context while rejecting it in the [-Poss] context.

The author interpreted these L2 results as indicating that target-like English emerged earlier in the Goal DOC than in the Benefactive DOC, which is suggestive of L1 transfer. Moreover, the advanced learners were able to overcome the non-facilitative L1 transfer and acquire the semantic constraint (i.e., the possession constraint) of the Benefactive DOC. Oh hypothesized that their knowledge of the semantics of the Goal DOC probably bootstraps the acquisition of the semantic constraint of the Benefactive DOC, although she did not elaborate on how this happens. However, it should be pointed out that the beginners' performance does not align very well with the L1 transfer account, according to which the Korean L2ers of English should accept the Goal DOC (in only the [+Poss] context) at an early stage of acquisition.

4.2.2 Yook (2012)

Yook (2012) employed an AJT and a written elicited-production task to test for L1 influence in the L2 acquisition of English ditransitives by Korean and Mandarin speakers. Yook pointed out that some English and Mandarin verbs that are semantically comparable do not behave the same in terms of the dative alternation. Three different types of English verbs were chosen based on how their translation equivalents are used in Mandarin: Type A consisted of PDC-only verbs, Type B consisted of DOC-only verbs, and Type C consisted of alternating verbs. Note that these labels may not always align with how the verbs behave in English. A total of 18 verbs were selected for the experiment (six for each type), as shown in Table 10. Twelve of these verbs (four per type) were used in the AJT and the remaining six verbs (two per type) were used in the elicited-production task.

Table 10**Verbs Used in Yook’s (2012) Study**

Verb type	Chinese verbs with their English translation equivalents
PDC-only	<i>dai</i> “bring,” <i>fa</i> “issue,” <i>ti</i> “kick,” <i>liu</i> “leave,” <i>ji</i> “mail,” <i>diu</i> “throw”
DOC-only	<i>huida</i> “answer,” <i>wen</i> “ask,” <i>fakuan</i> “fine,” <i>qian</i> “owe,” <i>jiao</i> “teach,” <i>gaosu</i> “tell”
Alternating	<i>wei</i> “feed,” <i>jie</i> “lend,” <i>zu</i> “rent,” <i>huan</i> “return,” <i>mai</i> “sell,” <i>song</i> “send”

The AJT had 12 verbs presented in both PDC and DOC sentences, resulting in 24 items. Thirty L1-Korean L2ers of English and 30 L1-Mandarin L2ers of English were recruited from beginning and low-intermediate classes of an intensive English program in the U.S. Participants’ length of residence in the U.S. ranged from four months to a year; no independent proficiency test was administered. The participants were asked to rate the acceptability of the sentences on a 5-point Likert scale.

The results showed that the L1-Korean L2ers rated PDC sentences higher than DOC sentences across all verb types. Yook explained this PDC preference as a case of L1 transfer, since Korean allows only the PDC (i.e., the [Dat-Acc] pattern; see §3.3). This finding is contrary to the assumptions held by Oh (2010), who considered the [Dat-Acc] pattern as the equivalent of the English DOC. In contrast, the L1-Mandarin L2ers’ ratings differed across the three verb types. For Type A verbs (exclusively PDC in Mandarin), they rated PDC sentences higher than DOC sentences. For Type B verbs (exclusively DOC in Mandarin), they rated DOC sentences higher than PDC sentences. Finally, for Type C verbs (which alternate in Mandarin), they gave comparable ratings to PDC and DOC sentences.

Similar results were obtained from the elicited-production task: The L1-Korean L2 group produced more PDC sentences regardless of verb type, while the L1-Chinese L2 group produced more PDC sentences for Type A verbs, more DOC sentences for Type B verbs, and an equal number of PDC and DOC sentences for Type C verbs. These results show very clear evidence of L1 influence on the L2 acquisition of ditransitives in English, which contrasts with the contradictory findings of studies on the L2 acquisition of Mandarin ditransitives (i.e., Yang & Luo, 2017; Y. Zhu & Zhao, 2016). An important difference in methodology between Yook’s study and Yang and Luo’s (2017) study has to do with the categorization criteria used to select and group the verbs. Although Yang and Luo also categorized verbs based on their syntactic behavior, i.e., the construction type(s) in which a given verb can participate, they made

categorization choices based on the verb's behavior in the target language. Conversely, Yook made the categorizations based on the verb's behavior in the L1 (for the Mandarin speakers, since (virtually) all Korean ditransitive verbs pattern the same—see §3.3), which explains why the L1 effects were so clear. Moreover, it appears that Yook's participants were more likely to be true beginning L2ers of English (based on length of residence in the U.S.).

There is, arguably, one shortcoming in Yook's analytical approach, however. While it is highly laudable (not to mention very refreshing) that the mean rating of each verb type was examined in terms of how that verb type patterns in the L1, it would have been helpful if Yook had additionally indicated how target-like the learners' performance was. For example, the low ratings in the DOC sentences for Type A verbs do not tell us whether the learners' performance was target-like or not because in this design, verbs in the same group may behave differently in English, e.g., some verbs can occur in the DOC, such as *bring*, and others cannot, such as *kick*.

4.2.3 K.-S. Park (2014)

As part of her dissertation research, K.-S. Park (2014) investigated whether L1-Korean adult L2ers of English transfer adherence to the *Given-before-New* Principle in regard to the dative alternation, that is, in regard to their syntactic preference between the PDC and the DOC. For example, a discourse-given Theme, e.g., *the toys*, tends to occur in the earlier position in the PDC in (48a), while a discourse-given Recipient, e.g., *the children*, tends to occur in the earlier position in the DOC in (48b).

- (48) a. I gave *the toys* to children. (PDC)
b. I gave *the children* toys. (DOC)

(adapted from K.-S. Park, 2011, p. 101, (1))

K.-S. Park developed two oral, contextualized preference tasks for her study: an NP Task and a Pronoun Task. The NP Task used definite lexical NPs (e.g., *the pie*, *the policeman*) as the given-referents and the Pronoun Task used pronouns (e.g., *it*, *him*) as the given-referents; the new referents in both tasks were plural indefinites with *some* (e.g., *some cookies*, *some friends*). The experimental conditions were created based on the information status of object arguments

(given vs. new) and construction type (PDC vs. DOC). The information status was manipulated as given-Theme and new-Recipient vs. given-Recipient and new-Theme, as laid out in Table 11.

Table 11
Information Structure per Condition in the English Preference Task (adapted from K.-S. Park, 2014, p. 123, Table 4.6)

Condition	Construction Type	Information structure
<i>given-Theme</i> & new-Recipient	PDC [NP _{THEME} –PP _{RECIPIENT}]	Given–New
	DOC [NP _{RECIPIENT} –NP _{THEME}]	New–Given
<i>given-Recipient</i> & new-Theme	PDC [NP _{THEME} –PP _{RECIPIENT}]	New–Given
	DOC [NP _{RECIPIENT} –NP _{THEME}]	Given–New

For each test sentence, a context was provided in order to establish the (relative) *givenness* of the two referents at issue, as illustrated in the sample items in (49) for the NP Task. In (49a), the referent of the Theme *the pie* is repeatedly mentioned in the context (and the referent of the Recipient *some friends* is not mentioned at all), so *the pie* is the given referent (and *some friends* is the new referent); in (49b) the reverse holds, in that the context repeatedly mentions the referent of the Recipient *the teacher* (but not the referent of the Theme *some letters*), thereby making *the teacher* the given referent (and *some letters* the new referent).

(49) a. **given-theme** & new-recipient

John came home. When he entered the kitchen, he was happy to find **two huge apple pies** on the table. They were still warm and looked very delicious. Just then his mom came home. John asked, “Mom, what will we do with **the two pies**?” His mom said, “We will eat **one** and give away **the other**.” John knew what to do with **the extra pie**.

- (i) John brought **the pie** to some friends. [Given–New] PDC
- (ii) John brought some friends **the pie**. [New–Given] DOC

b. **given-recipient** & new-theme

John liked **his English teacher**. He liked **her** voice and the way **she** explained everything to him. **She** helped him have a good time in **her** class so he never got bored. **She** was always kind and nice to him. So when **she** left for another school, he was very sad. He missed **her** very much.

- (i) John sent some letters to **the teacher**. [New–Given] PDC
- (ii) John sent **the teacher** some letters. [Given–New] DOC

(adapted from K.-S. Park, 2014, p. 126, (1), emphasis original)

K.-S. Park used six alternating verbs in the test sentences: *bring, give, mail, sell, send,* and *show*. Each verb was used once in the two conditions, yielding a total of 12 test sentences (6 tokens × 2 conditions). Twelve filler items were also included. Participants were told that they would play a game with the experimenter. They listened to the recorded narration of the context story; this was followed by two test sentences that described how the story ends, one in the PDC, the other in the DOC, after which they were asked, “Which one is the better way to say it?” Their responses were then recorded in writing by the experimenter.

Thirty Korean L2ers of English and 20 native English speakers recruited from the University of Hawai‘i participated in the experiment. The L2ers were divided into two proficiency levels—Higher group ($n = 16$) and Lower group ($n = 14$)—based on the proficiency scores they received from a picture-narration task. In order to make sure the participants had the requisite knowledge of the dative alternation for the selected English verbs in the first place, K.-S. Park had them complete an AJT on the PDC and DOC. For each participant, only the critical items with the verbs which were judged in a target-like manner for both the PDC and the

DOC in the AJTs (both acceptable in the NP Task; only the PDC acceptable in the Pronoun Task) were included in the data analysis of the preference task.

In the NP Task, both the Higher and Lower groups, like the native controls, strongly preferred the Given–New [NP PP] order in the *given-Theme* condition (83% for the Higher group; 81% for the Lower group). In the *given-Recipient* condition, on the other hand, both groups (unlike the native controls) preferred the New–Given [NP PP] order (63% for the Higher group; 68% for the Lower group), which is contrary to the Given-before-New Principle. These data, K.-S. Park suggests, indicate a general preference for the PDC over the DOC.

The results of the Pronoun Task, however, are quite different from those of the NP Task. For the *given-Theme* condition, both Higher and Lower L2ers, like the native controls, strongly preferred the Given–New [NP PP] order (94% for the Higher group; 92% for the Lower group). For the *given-Recipient* condition, the pattern is similar: Both groups, like the native controls, preferred the Given–New [NP NP] order (69% for the Higher group; 62% for the Lower group). In this case, the two sets of results are in compliance with the Given-before-New Principle.

The results suggest that the L1-Korean L2ers comply with the Given-before-New Principle when the given-Theme is a pronoun or a definite lexical NP as well as when the given-Recipient is a pronoun, but not (yet) when the given-Recipient is a definite lexical NP. K.-S. Park concluded that L2ers—who, importantly, do have knowledge of the Given-before-New Principle in their L1—are unable to transfer it to their L2.

In summary, three studies were reviewed in this section, all examining the L2 acquisition of English ditransitive constructions involving Korean and Mandarin speakers. Oh (2014) argued that the results of her AJT offered evidence of transfer of the possession constraint on the Goal DOC from L1 Korean into L2 English. Oh also found that advanced L2ers were able to recover from non-facilitative transfer. Yook (2012) found that both the Korean-speaking L2ers and the Mandarin-speaking L2ers showed strong signs of transfer of the dative-alternation patterns in their L2-English. K.-S. Park (2014), on the other hand, concluded that in regard to (relative) givenness of the two arguments in the PDC vs. the DOC, Korean-speaking L2ers did not transfer the Given-before-New Principle to their L2 English.

4.3 Summary of the chapter

This chapter has reviewed three studies on the acquisition of ditransitives in L2 Mandarin and three studies on the L2 acquisition of the English dative alternation by native speakers of either Korean or Mandarin. The overall findings suggest that a speaker's L1 grammar has an effect on L2-Interlanguage development, at least at early stages. When acquisitionists extend the study of non-native languages to L3 acquisition, the natural question to ask is whether there will be transfer from previously-learned languages, and if so, what the source(s) of that transfer will be. The next chapter elaborates on the specific research questions for the present study and introduces the experimental design.

Chapter 5. A New Experimental Design

This dissertation aims to accomplish three goals. The first goal is to test two competing hypotheses about the source of transfer in L3 acquisition: the L1 Status Factor (L1SF) and the L2 Status Factor (L2SF).¹³ The second goal is to test whether L2 proficiency plays a critical role in determining the source of transfer, an important question to investigate given that L2 proficiency is an understudied factor in the previous research on transfer in L3 acquisition. The vast majority of existing L3 studies have focused on L3 learners (L3ers) with (very) high L2 proficiency (e.g., Hermas, 2014; Na Ranong & Leung, 2009; Rothman, 2010; Rothman & Cabrelli Amaro, 2010) and/or have not controlled for proficiency in the L2 (e.g., Falk & Bardel, 2011; Giancaspro et al., 2015; Montrul, Dias, & Santos, 2011). The third goal is to test whether the transfer happens in a wholesale manner (e.g., Rothman, 2015; Schwartz & Sprouse, 2021a) or in a property-by-property manner (e.g., Slabakova, 2017; Westergaard, 2021).

To accomplish the first two research goals, the current study uses the design shown in Table 12, schematized as L1A–L2B–L3C vs. L1D–L2B–L3 L3C. Table 12 has four groups of beginning-level L3ers in total. A, B, C, and D represent four different languages; “low” and “high” indicate the (relative) L2 proficiency level.

Table 12

Abstract Experimental Design for L3ers

	Group 1	Group 2	Group 3	Group 4
L1	A	A	D	D
L2	B (low)	B (high)	B (low)	B (high)
L3	C	C	C	C

The logic of this design is as follows. First, the design allows for testing the L1SF and the L2SF by varying the L1s (A vs. D) across Groups 1–4, while keeping the L2 and the L3-target language constant but also varying L2 proficiency. In order to compare like with like, L2

¹³ I had planned to test the Typological Primacy Model along with the L1SF and the L2SF; and the original experimental design that my supervisor and I devised together (see Schwartz & Sprouse, 2021a) would have enabled me to do so. That plan unfortunately had to be modified to what is skeletonized in Table 12 because I was not able to find a sufficient number of the right type of participant (namely, L1English–L2Cantonese–L3Mandarin learners whose proficiency in Cantonese was (very) high).

proficiency is controlled between Group 1 and Group 3 and between Group 2 and Group 4. Second, this design makes it possible to test whether proficiency in the L2 affects the source of transfer by varying L2 proficiency (low vs. high) between Group 1 and Group 2 and between Group 3 and Group 4.¹⁴

The two hypotheses at issue make different predictions about the transfer patterns across the four groups. The L1SF predicts that L1 transfer will be found across all groups, whereas the L2SF predicts that L2 transfer will be found across all groups. Moreover, if L2 proficiency plays a role in determining the source of transfer, one would expect the source of transfer to differ between Groups 1 (low) and 2 (high) as well as between Groups 3 (low) and 4 (high).

Table 13 shows the languages used in the current study, with Korean, English, Mandarin, and Cantonese replacing A, B, C, and D, respectively, from Table 12.

Table 13

L3 Participant Groups

	Group 1	Group 2	Group 3	Group 4
L1	Korean	Korean	Cantonese	Cantonese
L2	English (low)	English (high)	English (low)	English (high)
L3	Mandarin	Mandarin	Mandarin	Mandarin

The target participants were therefore four groups of adult beginning-level L3ers of Mandarin. In this design, the L3 (Mandarin) is kept constant across all groups and the L1s (Korean and Cantonese) vary. The L2 is always English. The participants in Groups 1 and 2 share the same L1 (Korean); the only difference between them is the L2 English proficiency level (i.e., low vs. high). Similarly, the participants in Groups 3 and 4 share the same L1 (Cantonese); the only difference between them is again the L2 English proficiency level.

English was chosen to replace B, Mandarin to replace C, and Cantonese to replace D, for both theoretical reasons and practical reasons. Regarding the former, English and Cantonese pattern differently in terms of the Double Object Construction (DOC) and Passivization of the Recipient (POR) in the DOC, as reviewed in Chapter 3. These differences are important for the research objectives because if the L1 and the target-L2 converge on the properties under

¹⁴ Although proficiency is treated as a discrete variable (low vs. high) in Table 12 for the purpose of illustration, it was treated as a continuous variable in the data analyses.

investigation, we will not be able to discern the source of transfer. As for the latter reason, there exists a large population of Cantonese native speakers in Hong Kong who have learned English as their L2 and Mandarin as their L3 after Hong Kong's handover to mainland China in 1997. Therefore, it was possible to find seemingly qualified participants to test.

I chose Korean as the language to replace A for very similar theoretical and practical reasons. First, Korean and English differ in the DOC, Reverse Prepositional Dative Construction (PDC), and POR, which will in principle enable us to tell whether the transfer comes from the L1 or the L2-Interlanguage. Second, it proved relatively easy to find Korean learners of Mandarin as a third language. Koreans have constituted the largest number of overseas students in China for the last decade (Fang & Wu, 2016). In 2018, there were about 50,600 Koreans studying in China (Ministry of Education of the People's Republic of China, 2019). Many of these overseas students have been studying Mandarin in Chinese universities. In the meantime, virtually all Korean university students have learned (at least some) English as an L2 because it is a core subject in the Korean national curriculum. Therefore, Mandarin is almost inevitably their L3 rather than their L2.

With this experimental design, I sought answers to the following four research questions:

1. What patterns do we find across the four groups of L3ers regarding what is possible and impossible in the ditransitives and Passivization of the Recipient and Theme in the DOC in Mandarin?
2. Which one of the transfer models, i.e., the L1SF or the L2SF, best predicts and explains the results of the four groups of L3ers?
3. Does L2 proficiency play a critical role in determining the source of transfer?
4. Does transfer happen in a wholesale fashion or in a property-by-property fashion? Specifically, do we see different sources of transfer for the different linguistic phenomena tested in this study?

5.1 Participants

Participants in the study included a total of 39 L1Cantonese–L2English–L3Mandarin (CEM) learners and 35 L1Korean–L2English–L3Mandarin (KEM) learners. Five of the CEM L3ers did not complete the Mandarin proficiency task due to technical problems with the online

experiment, while all KEM L3ers completed all of the tasks. Among the 34 CEM L3ers and 35 KEM L3ers who completed the entire experiment, two CEM L3ers and one KEM L3er were identified as outliers and excluded from further data analysis (see §6.1 below). This left data from 32 CEM L3ers and 34 KEM L3ers for analysis.

In addition, four native-speaker control groups—Cantonese native speakers (CNS, $n = 22$), English native speakers (ENS, $n = 16$), Korean native speakers (KNS, $n = 15$), and Mandarin native speakers (MNS, $n = 23$)—were recruited to make sure (a) that native speakers’ judgments align with the facts described in the literature and (b) that all of the linguistic phenomena under investigation, in particular passive sentences, can be effectively tested via non-contextualized acceptability judgment tasks (AJTs) in which participants rate sentences without a discourse context. Among the four groups of native speakers, one KNS and one MNS were identified as outliers and excluded from data analysis (see §6.1). The background information for the remaining participants is given in Table 14.

Table 14
Participant Background Information

Group	n	Mean Age	Mean L2 AOA	Mean L3 AOA
CEM	32	23 (18–49)	3 (0–6)	8 (3–30)
KEM	34	29 (18–49)	9 (1–14)	18 (9–33)
CNS	22	28 (19–53)	NA	NA
ENS	16	29 (20–59)	NA	NA
KNS	14	31 (23–41)	NA	NA
MNS	22	32 (19–69)	NA	NA

Note. CEM = L1Cantonese–L2English–L3Mandarin learners; KEM = L1Korean–L2English–L3Mandarin learners; CNS = Cantonese native speakers; ENS = English native speakers; KNS = Korean native speakers; MNS = Mandarin native speakers; AOA = age of onset of acquisition. The range is given in parentheses.

The CEM L3ers were recruited from a university in Hong Kong. They were born and raised in Hong Kong and had acquired Hong Kong Cantonese from birth. Most of them had an early age of onset (AOA), having been exposed to English in preschool and kindergarten (mean AOA = 3) and had first begun to learn Mandarin in primary school (mean AOA = 8). However, there was variation in AOAs for both L2 English and L3 Mandarin. For instance, five of the CEM L3ers reported having started to learn English before age 3, but their early exposure to the language was limited to learning a few songs and the letters of the alphabet from their parents

and other caregivers. Since it would not be appropriate to categorize these individuals as simultaneous bilinguals, I treated them as child L2 learners. Moreover, while 27 CEM L3ers had an L3 AOA between 4 and 7 and should be categorized as child L3 learners, following the cutoff point used for child L2 learners (Schwartz, 2004; Unsworth, 2016), four of the CEM L3ers reported having an L3 AOA of 8 or older and are thus non-child learners (henceforth, “adult learners”) of L3 Mandarin. One CEM L3er is a simultaneous trilingual as he/she started learning Mandarin at the age of 3. Nonetheless, the adult L3ers’ performance in the experiments did not distinguish itself from that of the other, younger-starting learners of Mandarin as an additional language (henceforth, “early CEM starters”; see §6.3.2.2 below).

The KEM L3ers had later AOAs for both their L2 and their L3 than the CEM L3ers did.¹⁵ The KEM L3ers were recruited from a Korean university and from online language learning platforms. They were born and raised in Korea and had acquired Korean from birth. Most of them had started learning L2 English in primary school (mean AOA = 9) and L3 Mandarin in middle school or later in adult life (mean AOA = 18). The L2 AOA of the KEM L3ers ranged from 1 to 14. One reported having started learning English at the age of 3; since that participant’s early exposure was limited to English songs and letters of the alphabet, I did not treat this individual as a simultaneous bilingual. Therefore, the KEM L3ers is a group of both child and adult L2 learners of English. The KEM L3ers’ L3 AOA ranged from 9 to 33, so all of them are adult L3 learners.

5.2 Tasks

The L3ers participated in five tasks in the following order: (a) a language background questionnaire, (b) a Mandarin AJT, (c) an English AJT, (d) an English proficiency test, and (e) a Mandarin proficiency test. Testing learners’ L2 knowledge of the ditransitive patterns and passivization patterns of the DOC was integral to the study because their L2-Interlanguage grammars may not be target-like, and it is important to know what their performance looks like in the L2-Interlanguage in order to try to pinpoint the source of transfer.

¹⁵ To foreshadow the upcoming results: No effect of AOA was found (see §6.3.2.2).

The native-speaker controls for each language completed two tasks: (a) a language background questionnaire and (b) an AJT in their L1. In addition, the English native speakers completed the English proficiency test.¹⁶

5.3 Materials for testing language proficiency

The C-test developed by J.-H. Park and Choi (2018) was used to test participants' English proficiency. This test is comprised of three short texts with a total of 45 blanks. For each blank, the first letter of the word is kept in place to constrain the number of possible responses. Participants were instructed to complete the words by filling in the missing letters. The test materials are provided in Appendix A.

To measure Mandarin proficiency, I did not use a C-test because modern written Chinese is used as the standard written form for both Cantonese and Mandarin, and so written tests are not appropriate for assessing the Mandarin proficiency of Cantonese native speakers. In the field of L2 acquisition, the oral elicited-imitation task has long been recognized as a valid research tool to measure participants' proficiency level (e.g., Bley-Vroman & Chaudron, 1994; Henning, 1983; Kostromitina & Plonsky, 2022; Vinther, 2002). The rationale behind this task is that when the length of an auditorily-presented sentence to be repeated (i.e., "imitated") exceeds the limitation of short term memory, participants first have to comprehend and decode the sentence (as best they can) and only then recall and reconstruct it with their own grammar in order to reproduce it (Slobin & Welsh, 1973).

Thus, instead of a written task, an oral elicited-imitation task that was developed by Wu and Ortega (2013) was used as the Mandarin proficiency test. The test consists of 30 Mandarin sentences whose length ranges from seven to 19 syllables (see Appendix B). Participants were instructed to listen to each test sentence, wait five seconds, and then repeat it as accurately as possible. The purpose of the five-second pause is to discourage task-specific strategies involving rote memory.

¹⁶ The Mandarin native speakers were not asked to complete the Mandarin proficiency task.

5.4 Materials for the AJT

The AJT stimuli consisted of 25 sets of critical sentences in English, Cantonese, Korean, and Mandarin. Cantonese sentences were displayed in traditional Chinese characters, Korean sentences were displayed in Hangul, and Mandarin sentences were displayed in simplified Chinese characters, accompanied by Pinyin romanization as an aid for (L1 Korean) non-native speakers. Each set of sentences comprised five conditions, as illustrated in (50)–(54).

(50) Condition 1: Double Object Construction (DOC): NP_{RECIPIENT} + NP_{THEME} ($k = 5$)

- a. Fred sent John gifts. (English)
- b. * Lauwong sung-zuo Siuming laimat. (Cantonese)
Lauwong send-Perf Siuming gift
- c. * Fred-ka John-ul senmwul-ul ponay-ss-ta. (Korean)
Fred-Nom John-Acc gift-Acc send-Pst-Dec
- d. Laowang song-gei-le Xiaoming liwu. (Mandarin)
Laowang send-give-Perf Xiaoming gift

(51) Condition 2: Prepositional Dative Construction (PDC): NP_{THEME} + PP_{RECIPIENT} ($k = 5$)

- a. Fred sent gifts to John. (English)
- b. Lauwong sung-zuo laimat bei Siuming. (Cantonese)
Lauwong send-Perf gift to Siuming
- c. Fred-ka senmwul-ul John-eykey ponay-ss-ta. (Korean)
Fred-Nom gift-Acc John-Dat send-Pst-Dec
- d. Laowang song-le liwu gei Xiaoming. (Mandarin)
Laowang send-Perf gift to Xiaoming

(52) Condition 3: Reverse PDC: PP_{RECIPIENT} + NP_{THEME} ($k = 5$)

- a. * Fred sent to John gifts. (English)
- b. * Lauwong sung-zuo bei Siuming laimat. (Cantonese)
Lauwong send-Perf to Siuming gift
- c. Fred-ka John-eykey senmwul-ul ponay-ss-ta. (Korean)
Fred-Nom John-Dat gift-Acc send-Pst-Dec
- d. * Laowang song-le gei Xiaoming liwu. (Mandarin)
Laowang send-Perf to Xiaoming gift

(53) Condition 4: Passivization of the Recipient (POR) in the DOC ($k = 5$)

- a. John was sent gifts by Fred. (English)
- b. * Siuming bei Lauwong sung-zuo laimat. (Cantonese)
Siuming BEI Lauwong send-Perf gift
- c. * John-i Fred-ey-uyhay senmwul-ul ponay-cy-ess-ta. (Korean)
John-Nom Fred-by gift-Acc send-Pass-Pst-Dec
- d. * Xiaoming bei Laowang song-gei-le liwu. (Mandarin)
Xiaoming BEI Laowang send-give-Perf gift

(54) Condition 5: Passivization of the Theme (POT) in the DOC ($k = 5$)

- a. * Gifts were sent John by Fred. (English)
- b. * laimat bei Lauwong sung-zuo Siuming. (Cantonese)
gift BEI Lauwong sent-Perf Siuming
- c. * senmwul-i Fred-ey-uyhay John-ul ponay-cy-ess-ta. (Korean)
senmwul-Nom Fred-by John-Acc ponay-Pass-Pst-Dec
- d. liwu bei Laowang song-gei-le Xiaoming. (Mandarin)
gift BEI Laowang send-give-Perf Xiaoming

Since this study is primarily concerned with L3ers' knowledge of the core syntactic patterns of Mandarin ditransitives, I chose verbs that have the DOC vs. PDC alternation in all three languages that have it, i.e., English, Cantonese, and Mandarin (for Korean, see §3.3); I also made an effort to select verbs that are semantically comparable across the four languages. The

list of the four verbs chosen in each language is given in Table 15. Since I could only find four (common) verbs that satisfy the criteria listed above, it is not the case that each verb appears in an equal number of sets of sentences. Specifically, *song* “send” was used in seven sets of sentences, while *di* “pass,” *jiang* “award,” and *mai* “sell” were each used in six sets of sentences. The 25 sets of sentences were then distributed across five lists in a Latin-square design by the randomization mechanism of Ixex Farm (Drummond, n.d.), resulting in 25 sentences in each list with five tokens per condition.

Table 15
Verbs Used in the AJT

English	Cantonese	Korean	Mandarin
offer	zoeng “award”	syehata “award”	jiang “award”
pass	dei “pass”	kenneta “pass”	di “pass”
sell	mai “sell”	phalta “sell”	mai “sell”
send	sung “send”	ponayta “send”	song “send”

In addition, there were 25 filler items in each list that balanced the (intended) numbers of grammatical and ungrammatical critical items in each language. For example, the Mandarin AJT had 15 grammatical critical sentences and 10 ungrammatical critical sentences, and so 15 ungrammatical fillers and 10 grammatical fillers were needed to maintain a 1:1 ratio of grammatical to ungrammatical trials. The fillers differed across the four languages, but they fell into five types within each language. Crucially, the Mandarin fillers included five monotransitive long *by/bei*-passive sentences as control items to check whether the learners had successfully acquired non-ditransitive long passives (but see fn. 19). Examples of grammatical and ungrammatical sentences in English are given in (55), and the full list of all AJT items (including fillers) in each language is provided in Appendices C1–C4.

- (55) a. John put a book on the table.
 b. * Joan likes China and speaks often Chinese.

The AJT was administered over the internet on Ixex Farm. The test sentences were presented on a computer screen, along with a 4-point “smiley face” scale, the English version of which is shown in Figure 1.

Figure 1

Four-Point “Smiley Face” Scale



Click boxes to answer. If you cannot provide a rating, click on the 'x' key on your keyboard instead.

Participants were instructed to click on the appropriate face to indicate their rating: 😞 stood for “absolutely unacceptable,” 😐 stood for “probably unacceptable,” 😊 stood for “probably acceptable,” and 😄 stood for “absolutely acceptable.” They were also told that if they could not rate the sentence for some reason, they were to click the “x” key to indicate “I don’t know.” The critical and filler items were presented in a pseudo-random order so that no two critical items were adjacent to each other.

5.5 Summary

This chapter introduced the novel L1A–L2B–L3C vs. L1D–L2B–L3C experimental design used to test the roles that L1 status, L2 status, and L2 proficiency play in determining the source of transfer in L3 acquisition. It then described the background information of the participants of this study as well as the study’s five tasks. It is worth noting that although my original plan was to test adult beginning learners of Mandarin, the majority of the CEM L3ers recruited had been child L3ers, while all the KEM L3ers had been adult L3ers. Therefore, additional analyses will be undertaken to examine if the factor “age of onset of acquisition” exerts any influence on participants’ transfer patterns. The results of the language proficiency tests and the AJTs are provided in Chapter 6.

Chapter 6. Results

This chapter presents the results of the proficiency tests and the acceptability judgment tasks (AJTs). I first introduce the methods used in scoring the English and Mandarin proficiency tests as well as the data transformation procedure and statistical tools used for the analyses of the AJT data (§6.1). I then present the results of the English and Mandarin proficiency tests (§6.2), followed by the AJT results (§6.3). The AJT results for the native speakers come first in §6.3.1 to set a baseline for comparison with the L3ers, followed by the results for the L3ers in §6.3.2, which is further divided into two sections: §6.3.2.1 for the results from the L3ers in the English AJT; §6.3.2.2 for the results from the L3ers in the Mandarin AJT.

6.1 Data analysis

Scoring method for the proficiency tests. I used an acceptable-answer method to score the English proficiency test whereby answers were counted as correct if they were deemed contextually acceptable, even if they were not the exact words used in the original text. In addition, spelling errors were not penalized. The answers were scored in a binary fashion, with correct answers receiving one point and incorrect answers receiving no points. The maximum score was 45.

For the Mandarin proficiency test, I followed the 5-point scoring rubric provided in Wu and Ortega (2013, p. 689):

4 = Perfect repetition

3 = Accurate content repetition with some (ungrammatical or grammatical) changes of form

2 = Changes in content or in form that affect meaning

1 = Repetition of half of the stimulus or less

0 = Silence, only one word repeated, or unintelligible repetition

The highest possible score was 120 (30 items × 4 points). To ensure scoring reliability, the elicited-imitation data were independently scored by the author and a second rater. The scoring results between the two raters reached 90.5% agreement. All disagreements were resolved by discussion between the raters.

Data transformation and exclusion for the AJT results. The “smiley face” ratings were converted to numbers 1 (absolutely unacceptable) to 4 (absolutely acceptable), and “I don’t know” responses were removed from the dataset, resulting in the loss of 0.1% of the data from the CEM L3ers and 1.9% of the data from the KEM L3ers. There was no data loss in the native control groups.

Steps were also taken to identify and exclude outliers prior to analysis. First, responses on filler items were converted to binary accept/reject ratings: Responses of “1” and “2” were coded as rejection, and ratings of “3” and “4” were coded as acceptance. The mean z -scores on the filler items are provided in Appendix D. A z -score represents the distance of a particular value from the mean in standard deviation units. Participants whose accuracy on the fillers was more than two standard deviations below the (respective) group mean were flagged as outliers. Two CEM L3ers, one KEM L3er, one Korean native speaker, and one Mandarin native speaker were identified as outliers based on this criterion, and were removed from the data analyses. Detailed analysis revealed that the two CEM L3ers had a strong “yes” bias for the Mandarin fillers: One had 90% accuracy on grammatical fillers and 0% accuracy on ungrammatical fillers, and the other had 90% accuracy on grammatical fillers and 13% accuracy on ungrammatical fillers. I did not find strong “yes” or “no” bias in other outliers.

For further analyses of the data from the critical conditions, the raw 1–4 ratings were converted to by-participant z -scores following Sprouse, Wagers, and Philips (2012) to minimize scale bias. The z -scores were calculated separately for each participant using their ratings for all 50 critical and filler items, with positive scores reflecting ratings above the individual’s mean response and negative scores reflecting ratings below the mean. Also, the z -scores were calculated separately for each language in which a participant was tested, because previous research has suggested that the same participant may use rating scales differently in different languages (Sorace, 1996; Spinner & Gass, 2019).

Various statistical tests were used in this study, including two-sample t -tests (for comparing mean proficiency scores among different groups of learners), mixed effects linear regression models (for comparing the AJT z -score results among different groups of learners), and simple linear regression (for correlation analysis). Considering the small sample sizes in this study, the alpha value was set to 0.01 to reduce the risk of a Type I error. All the statistical

analyses conducted in this study were performed using R (R core team, 2020) and RStudio (RStudio Team, 2019) software.

In the following sections, the results of the proficiency tests and the AJTs are presented.

6.2 Results of the proficiency tests

I start with the two proficiency tests, first the results of the English C-test and then the results of the Mandarin oral elicited-imitation task.

The results of the English and Mandarin proficiency tests for the CEM and KEM L3ers (along with the English native-speaker results) are given in Table 16.

Table 16
English and Mandarin Proficiency Scores

Group	Language: English Max = 45; Mandarin Max = 120	<i>n</i>	Mean (percent of Max)	SD	Range
ENS	English	16	37.75 (83%)	6.35	19–45
CEM	English	32	28.84 (64%)	6.97	10–41
KEM	English	34	24.76 (55%)	8.67	5–39
CEM	Mandarin	32	103.70 (86%)	9.46	79–117
KEM	Mandarin	34	56.29 (46%)	21.21	8–100

Note. ENS = English native speakers; CEM = L1Cantonese–L2English–L3Mandarin learners; KEM = L1Korean–L2English–L3Mandarin learners.

In the English proficiency test, the mean scores out of 45 were 37.75 (83%) for the English native speakers, 28.84 (64%) for the CEM L3ers, and 24.76 (55%) for the KEM L3ers. One English native speaker scored 19 points, which is two standard deviations below the mean and is considered an outlier;¹⁷ the rest of the English native speakers all scored within two standard deviations below or above the mean. A two-sample *t*-test was performed to compare the means of the CEM and KEM L3ers, and the results showed that the difference was not statistically significant ($t(64) = 2.09, p = .04$ —recall that the alpha value was set to 0.01 to reduce the risk of a Type I error). Both the CEM L3ers and the KEM L3ers had a wide range of English proficiency scores: 10 to 41 for CEM L3ers, and 5 to 39 for KEM L3ers. This wide proficiency

¹⁷ This participant was not removed from the AJT result analysis because his/her performance on the AJT did not meet the exclusion criteria (see §6.1 above).

range satisfies the requirement of the experimental design that both low and high L2 proficiency levels be represented within the CEM and KEM groups.

As for the L3 Mandarin proficiency test, the CEM L3ers had a much higher mean score ($M = 103.7$ (86%)) than the KEM L3ers did ($M = 54.94$ (46%)), and the difference is statistically significant ($t(64) = 11.59, p < .001$). This suggests that the CEM L3ers in this study were not the beginning-level L3ers of Mandarin that I had intended to recruit. It turned out that it was not easy to find beginning CEM L3ers (much less absolute CEM beginners) at Hong Kong universities because most of the students in those institutions have been studying Mandarin since elementary school.

One of the paradoxes facing L3 acquisition (as well as L2 acquisition) researchers is that although transfer effects are expected to be most pronounced in absolute beginners (Puig-Mayenco & Rothman, 2020), participants need a certain amount of L3 proficiency just to comprehend the types of sentences used in linguistic experiments. However, there are cases in which transfer effects linger (long) past the initial stages of acquisition, as has often been demonstrated in the literature (e.g., Kush & Dahl, 2020; Marsden, 2009; Rankin, 2014; Yuan, 2013). Sometimes transfer may persist even into very advanced proficiency levels, especially when there is no positive evidence in the input to trigger grammar restructuring. While conceding that having non-beginners of the L3 in my study is certainly less than ideal, I maintain that carefully crafted studies can still have a reasonably good chance of detecting transfer effects in such learners.

6.3 Acceptability judgment task results

I now turn to the analyses of the acceptability judgment task (AJT) results, first for the native-speaker controls and then for the L3 learners.

6.3.1 AJT results of native-speaker control groups

The AJT results of the native-speaker control groups come first. The purpose of having these control groups was to ensure (a) that the facts described in the literature (see summaries in

Table 17, reproduced from Table 2) were borne out in the native speakers' judgments in the AJT and hence (b) that the testing materials used in this study were appropriate.¹⁸

Table 17

Similarities and Differences Among English, Cantonese, Korean, and Mandarin

	DOC	PDC	Reverse PDC ^a	POR	POT
English (L2)	✓	✓	x	✓	x
Cantonese (L1)	x	✓	x	x	x
Korean (L1)	x ^b	✓	✓	x	x
Mandarin (L3)	✓	✓	x	x	✓

Note. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

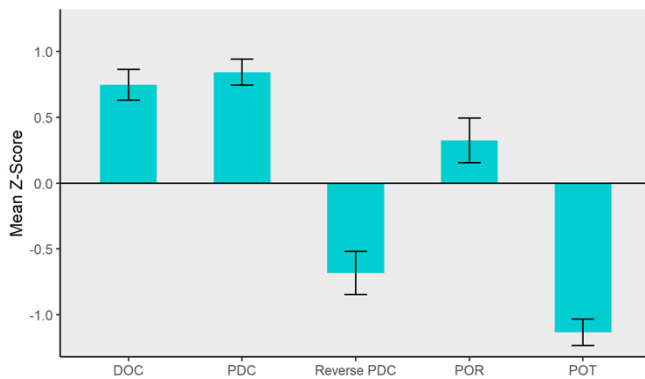
^aThe Reverse PDC refers to the V + PP_R + NP_T pattern, which corresponds to the canonical [PP_{RECIPIENT}-Dat NP_{THEME}-Acc] construction in Korean.

^bThis pattern is possible with only a very limited number of verbs.

In English, only the Reverse PDC and POT are ungrammatical. Figure 2 displays the mean z-score ratings given by the English native speakers (ENSs) in the five critical conditions.

Figure 2

Mean Ratings of English Native Speakers by Condition



Note. Error bars represent 95% confidence intervals. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

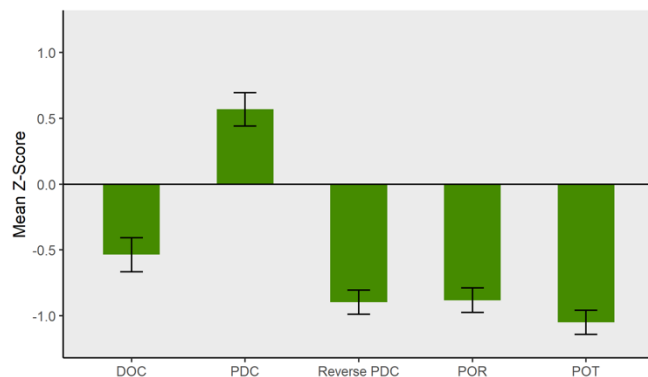
¹⁸ In a pilot study, Cantonese native speakers rejected the DOC condition, *contra* the description in the literature, due to the use of long NPs as the Theme (e.g., *yat fan laimat* “one-CL gift”). Subsequently, the long NPs were changed to bare NPs (*laimat* “gift”), and native speakers then accepted the sentences in this condition. I thank Li ‘Julie’ Jiang for suggesting this change.

The English native speakers' judgments conform to what has been reported in the literature, that is, participants' z -scores for the Reverse PDC and POT were low, whereas their z -scores for the DOC, PDC, and POR were (relatively) high. Note that the mean z -score for the POR (0.31) was lower than those for the DOC (0.75) and the PDC (0.85), possibly because (out of the blue) passive sentences are more marked than active sentences. Results of a mixed effects linear regression model (see Table 18 in §6.3.2.1) showed that the native English controls rated the Reverse PDC and POT significantly lower than the DOC. They also rated the POT significantly lower than the POR ($\beta = -1.47, t = -8.11, p < .001$, see Table 19 in §6.3.2.1).

In Cantonese, only the PDC is grammatical among the five constructions tested. As shown in Figure 3, the Cantonese native speakers had a (relatively) high mean z -score in the PDC condition, and their z -scores in the other four conditions were (relatively) low.

Figure 3

Mean Ratings of Cantonese Native Speakers by Condition

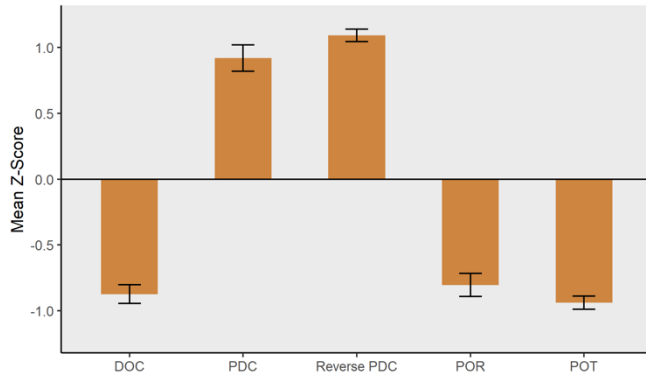


Note. Error bars represent 95% confidence intervals. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

In Korean, only the PDC and Reverse PDC are possible according to the literature, and Figure 4 shows that the Korean native speakers' judgments were as expected. That is, their z -scores for the DOC, POR, and POT were low, whereas their z -scores for the PDC and Reverse PDC were high.

Figure 4

Mean Ratings of Korean Native Speakers by Condition

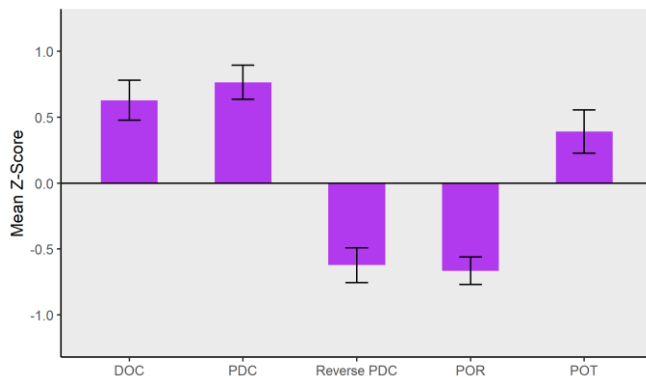


Note. Error bars represent 95% confidence intervals. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

In Mandarin, the Reverse PDC and POR are the only ungrammatical constructions among the five tested. Figure 5 reveals that the Mandarin native speakers' judgments aligned with the facts in Table 17.

Figure 5

Mean Ratings of Mandarin Native Speakers by Condition



Note. Error bars represent 95% confidence intervals. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

The Mandarin native speakers had (relatively) low z -scores for the Reverse PDC and POR, and they had (relatively) high z -scores for the DOC, PDC, and POT. It is worth noting that (similar to

the POR in English) the mean z -score for the POT (0.39) was lower than the mean z -scores for the DOC (0.63) and the PDC (0.77).

Summary. The AJT results of the native-speaker control groups provide experimental evidence in support of the generalizations in the literature. The results also confirmed that passives can be tested without discourse contexts in AJT stimuli, with the caveat that grammatical passive conditions (in the critical items) in English and Mandarin were rated lower than the other two grammatical active conditions. Recall that grammatical long monotransitive passives in English and Mandarin were included as filler items, intended to serve as controls. Unfortunately, due to experimental error, the English long monotransitive passives presented to participants were ungrammatical, receiving low ratings from the ENS participants.¹⁹ The Mandarin long monotransitive passives were grammatical and received a mean z -score of 0.39 by the native controls, on par with their ratings for the Mandarin POT.

6.3.2 AJT results of the L3ers

I now turn to the AJT results of the L3ers. Recall that all L3ers took AJTs in both their L2 (English) and L3 (Mandarin). The L2-English AJT results will be presented first, followed by the L3-Mandarin AJT results of the CEM and KEM L3ers.

6.3.2.1 English AJT results

Let us first look at L3ers' performance in the L2 to get an idea of what their L2-Interlanguage grammar looks like regarding the five constructions. This piece of information is (potentially) important in helping us to identify the source of transfer. Even though great care was taken to select linguistic phenomena that differ between the L1 and the target-L2, whether the L2-Interlanguage grammar has converged on the target-L2 grammar is an empirical question.

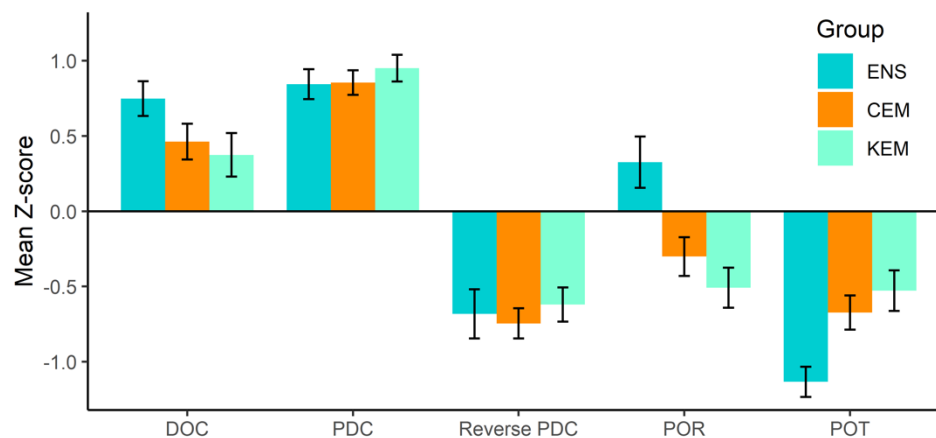
Figure 6 shows the CEM and KEM L3ers' mean z -scores on the five sentence types in the English AJT in comparison to those of the English native speakers. CEM and KEM L3ers' mean

¹⁹ The intended passive fillers were items like *Maria was cheated by Emily*, but the actual stimuli erroneously contained the word *deliberately*, as in **Maria was deliberately cheated by Emily*. During the piloting stage, I had wanted to test Huang et al.'s (2009) comparative observation that whereas English *be* passives are not compatible with subject-oriented adverbs like *deliberately*, Mandarin passives are. This attempt was purely exploratory, and I later decided not to pursue this line of inquiry. It is unfortunate that I did not realize my failure to remove *deliberately* from the English set (and thus have it serve as a set of grammatical fillers) until after data collection.

ratings were comparable to those of native speakers on the DOC, PDC, Reverse PDC, and POT: They accepted the DOC and PDC and rejected the Reverse PDC and POT, although the CEM and KEM L3ers' mean ratings on the DOC are lower than that of the ENSs. However, the CEM and KEM L3ers' mean negative ratings on the POR (CEM: $M = -0.30$; KEM: $M = -0.5$) differed from the positive ratings of the ENSs ($M = 0.31$).

Figure 6

Mean Ratings of the CEM and KEM L3ers (and the Native Controls) in the English AJT



Note. Error bars represent 95% confidence intervals. ENS = English native speakers; CEM = L1Cantonese–L2English–L3Mandarin learners; KEM = L1Korean–L2English–L3Mandarin learners; DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

To further explore the extent of the difference of CEM and KEM L3ers' ratings from those of native controls in the DOC condition, I fit the data to mixed effects linear regression models with *Group* (ENS vs. CEM vs. KEM) and *Condition* (DOC vs. PDC vs. Reverse PDC vs. POR vs. POT) as fixed effects and with *Participant* and *Item* as random effects. The maximal model included random intercepts for by-participant and by-item variance as well as by-participant random slope for *Condition* and by-item random slope for *Group* and *Condition* when such models converged. All models were fit using the lme4 (Bates, Mächler, Bolker, & Walker, 2015) and lmerTest package (Kuznetsova, Brockhoff, & Christensen, 2017) in R. The factor *Group* was dummy-coded, with the ENS group set as the reference level. The factor of *Condition* was also dummy-coded, with the DOC set as the reference level. A summary of the model is given in Table 18.

Table 18**Results of the Linear Mixed Effects Models for the Five Conditions in the English AJT**

Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>	
(Intercept, Ref: ENS, DOC)	0.75	0.13	5.76	<.001	***
CEM	-0.28	0.15	-1.87	.06	
KEM	-0.37	0.15	-2.42	.01	*
PDC	0.08	0.14	0.58	.56	
Reverse PDC	-1.41	0.16	-8.89	<.001	***
POR	-0.43	0.16	-2.67	.02	*
POT	-1.88	0.18	-10.45	<.001	***
Group(CEM) × Condition(PDC)	0.30	0.16	1.83	.07	
Group(KEM) × Condition(PDC)	0.48	0.16	2.92	.004	**
Group(CEM) × Condition(Reverse PDC)	0.23	0.18	1.23	.22	
Group(KEM) × Condition(Reverse PDC)	0.43	0.19	2.30	.02	*
Group(CEM) × Condition(POR)	-0.34	0.20	-1.68	.09	
Group(KEM) × Condition(POR)	-0.48	0.20	-2.39	0.02	*
Group(CEM) × Condition(POT)	0.75	0.21	3.46	<.001	***
Group(KEM) × Condition(POT)	0.97	0.21	4.56	<.001	***

Note. Formula (lmer): $z\text{-scores} \sim \text{group} * \text{condition} + (1 + \text{condition} | \text{participant}) + (1 + \text{condition} + \text{group} | \text{item})$; ENS = English native speakers; DOC = Double Object Construction; CEM = L1Cantonese–L2English–L3Mandarin learners; KEM = L1Korean–L2English–L3Mandarin learners; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

For the DOC condition, the KEM L3ers' mean z -score was significantly lower than that of the ENSs ($\beta = -0.37$, $t = -2.42$, $p = .01$), suggesting L1 transfer; while the CEM L3ers' mean rating was only marginally significantly lower than that of the ENSs. Moreover, the interaction between Group (CEM) and Condition (POT) was significant ($\beta = 0.75$, $t = 3.46$, $p < .001$); this indicates that the difference between English native speakers' ratings on the DOC and POT was significantly different from that between CEM L3ers' ratings on the DOC and POT. Likewise, the Group (KEM) × Condition (POR) interaction and the Group (KEM) × Condition (POT) interaction were also significant. These interactions suggest that English native speakers and L3ers treated the two passive patterns differently.

To examine participants' ratings on the passives separately from the active sentences, I then fit the data of the two passives to a second mixed effects linear regression model with *Group* (ENS vs. CEM vs. KEM) and *Condition* (POR vs. POT) as fixed effects. The two factors were dummy-coded, with ENS and POR set as the reference level. Table 19 summarizes the results of this model. Both the CEM and KEM groups gave significantly lower ratings for the

POR than the ENS group did (CEM: $\beta = -0.63$, $t = -4.27$, $p < .001$; KEM: $\beta = -0.85$, $t = -5.71$, $p < .001$).

Table 19

Results of the Linear Mixed Effects Model for the Passive Conditions in the English AJT

Fixed effects	β	SE	t	p	
(Intercept, Ref: ENS, POR)	0.33	0.14	2.34	.02	*
CEM	-0.63	0.14	-4.27	<.001	***
KEM	-0.85	0.14	-5.71	<.001	***
POT	-1.47	0.18	-8.11	<.001	***
Group(CEM) \times Condition(POT)	1.09	0.19	5.51	<.001	***
Group(KEM) \times Condition(POT)	1.46	0.19	7.42	<.001	***

Note. Formula (lmer): $z\text{-scores} \sim \text{group} * \text{condition} + (1 + \text{condition} | \text{participant}) + (1 + \text{condition} + \text{group} | \text{item})$; ENS = English native speakers; POR = Passivization of the Recipient in the DOC; CEM = L1Cantonese–L2English–L3Mandarin learners; KEM = L1Korean–L2English–L3Mandarin learners; POT = Passivization of the Theme in the DOC.

It is worth noting that the CEM and KEM L3ers’ low z -scores on critical items with passives were not an indication of their degraded ratings on English passive sentences in general, since their mean z -score ratings for long monotransitive passives in English (e.g., * *Joan was deliberately beaten by John*) were positive ($M = 0.42$ for the CEM L3ers and $M = 0.29$ for the KEM L3ers).²⁰ The CEM and KEM L3ers’ non-target-like performance on the English POR could be attributed to persistent L1 transfer, as the POR is ungrammatical in Cantonese ($M = -0.88$) and Korean ($M = -0.80$). However, transfer effects were not found across the board equally. For example, Korean allows the Reverse PDC while English does not. The KEM L3ers did not give a high rating to the English Reverse PDC like they did with the Korean Reverse PDC. Instead, their mean z -score rating of the English Reverse PDC was negative ($M = -0.61$).

6.3.2.2 Mandarin AJT results

We now move on to the L3ers’ performance in Mandarin, which is the main focus of this study. The organization of this section is as follows: The CEM L3ers’ results are considered first, followed by those of the KEM L3ers.

²⁰ As mentioned in the previous section, the English native speakers rejected such sentences, probably because of the incompatibility of the adverb *deliberately*. The CEM L3ers accepted these sentences in English due probably to L1 transfer, since *zyun1dang1* “deliberately” in Cantonese is compatible with passives (mean z -score = 0.77).

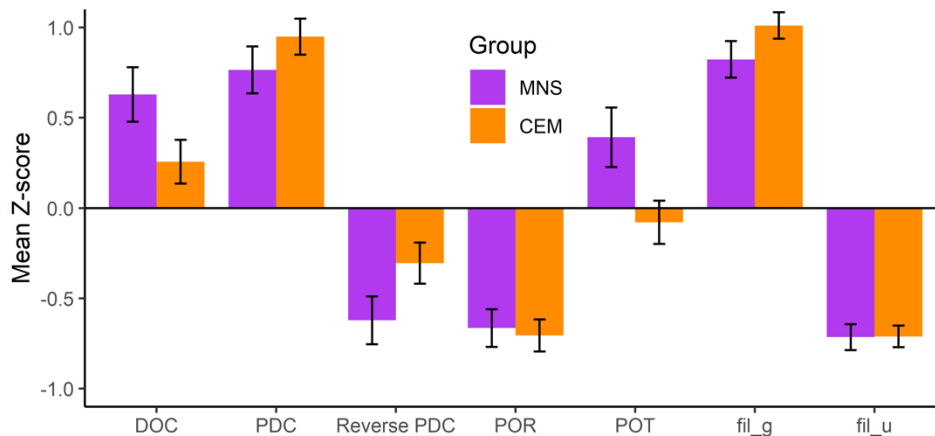
In analyzing the CEM L3ers' results, I first present the overall mean z -score ratings for the five properties, followed first by statistical analyses and then by detailed individual analyses of the CEM L3ers' performance on the DOC, POR, and POT, but not on the PDC and Reverse PDC because there was little inter-participant variation in these two conditions (and the results in these two conditions do not directly address the research questions). I then move on to describe the correlation analyses conducted to explore the roles of L2 proficiency and L3 proficiency as well as the factor of age of onset of acquisition.

The organization of the KEM L3ers' results is very similar: First presented are the overall mean z -score ratings for the five properties tested, followed by statistical analyses and detailed individual analyses of the KEM L3ers' performance on the DOC, Reverse PDC, PDC, POR, and POT. The exploration of the roles of L2 proficiency and L3 proficiency is presented last.

CEM L3ers. Figure 7 displays the CEM L3ers' mean z -scores on the Mandarin AJT alongside those of the Mandarin native speakers for comparison.

Figure 7

Mean Ratings of the CEM L3ers (and the Native Controls) in the Mandarin AJT



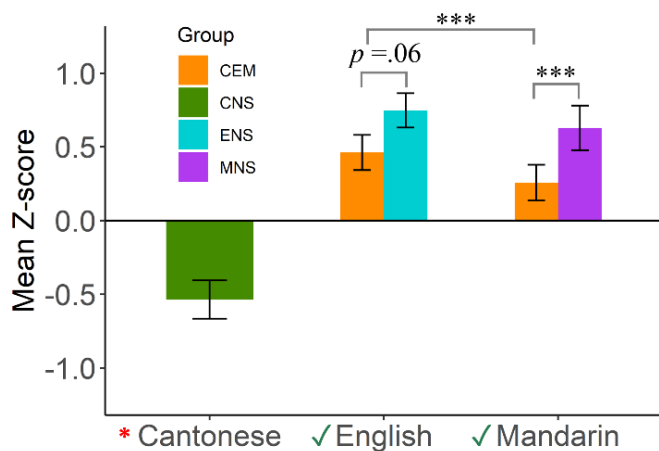
Note. Error bars represent 95% confidence intervals. MNS = Mandarin native speakers; CEM = L1Cantonese–L2English–L3Mandarin learners; DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC; fil_g = grammatical fillers; fil_u = ungrammatical fillers.

The DOC and the PDC received positive z -scores from the CEM L3ers, while the Reverse PDC, POR, and POT all received negative z -scores.

The results for the DOC and POR—two properties on which CEM L3ers’ L1 (Cantonese) and target-L2 grammar pattern differently—were expected to be decisive in answering the question of which language transfers in L3 acquisition. I start with the results for the DOC first.

CEM AJT results for the Mandarin DOC. Figure 8 combines the CEM L3ers’ DOC z -scores in English and Mandarin with the DOC z -scores of the native speakers of Cantonese, English, and Mandarin. As mentioned in §6.3.1, Cantonese native speakers’ mean z -score on the Cantonese DOC was negative, and English and Mandarin native speakers’ mean z -score on the DOC in their respective native languages was positive. The mixed effects analyses reported above in §6.3.2.1 indicated that CEM L3ers’ mean z -score rating on the English DOC was marginally significantly lower from that of the English native speakers.

Figure 8
Mean Ratings of the CEM L3ers (and the Native Controls) on the DOC in Cantonese, English, and Mandarin



Note. CEM= L1Cantonese–L2English–L3Mandarin learners; CNS = Cantonese native speakers; ENS = English native speakers; MNS = Mandarin native speakers.

The difference in ratings on the Mandarin DOC between the CEM L3ers and Mandarin native speakers was assessed by way of a mixed effects linear regression analysis with *Group* (ENS vs. CEM) as a fixed effect and with *Item* as a random effect. The summary of the model is

given in Table 20. Although the mean z -scores for the Mandarin DOC were positive for both groups, the CEM L3ers' DOC z -score was significantly lower than that of the native Mandarin speakers ($\beta = -0.39, t = -3.36, p = .002$), which is suggestive of L1 transfer.

Table 20

Results of the Linear Mixed Effects Model for the DOC Condition in the Mandarin AJT

Fixed effects	β	SE	t	p	
(Intercept, Ref: MNS)	0.63	0.11	5.74	<.001	***
CEM	-0.39	0.11	-3.36	.002	**

Note. Formula (lmer): $z\text{-scores} \sim \text{group} + (1 + \text{group} | \text{item})$; DOC = Double Object Construction; MNS = Mandarin native speakers; CEM= L1Cantonese–L2English–L3Mandarin learners.

An additional mixed effects linear regression analysis was conducted to compare the CEM L3ers' mean z -scores on the Mandarin DOC trials against their own rating on the English DOC trials, with *Language* (English vs. Mandarin) as a fixed effect and *Item* as a random effect. The factor is dummy-coded, with English set as the reference level. This comparison between the L3ers' ratings on the English and Mandarin DOC is to mitigate the “comparative fallacy” raised by Bley-Vroman (1983), who argued that non-native speakers' Interlanguage grammar has its own systematicity that may not be comparable to that of the native speakers. The contrast (see Table 21) approached statistical significance, with the Mandarin DOC rated lower than the English DOC ($\beta = -0.21, t = -2.22, p = .03$), giving further evidence for the L1 transfer hypothesis.

Table 21

Results of the Linear Mixed Effects Model Comparing CEM L3ers' Ratings on the English and Mandarin DOCs

Fixed effects	β	SE	t	p	
(Intercept, Ref: English)	0.45	0.08	5.48	<.001	***
Mandarin	-0.21	0.09	-2.22	.03	*

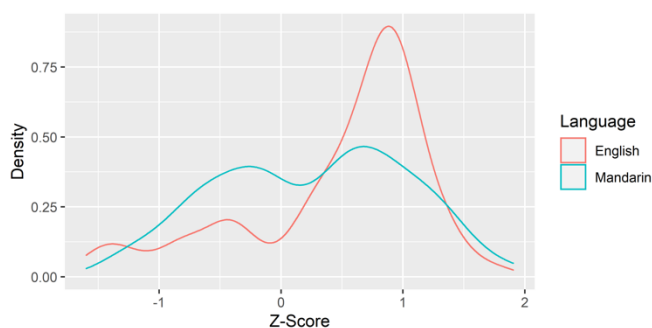
Note. Formula (lmer): $z\text{-scores} \sim \text{language} + (1 + \text{language} | \text{participant}) + (1 + \text{language} | \text{item})$. CEM= L1Cantonese–L2English–L3Mandarin learners; DOC = Double Object Construction.

To investigate whether there were inconsistent judgments across trials, I followed Kush and Dahl's (2020) procedure for using density plots to examine the distribution of ratings. A

density plot is a smoothed version of a histogram. According to Kush and Dahl, response consistency is reflected in the degree to which participants' judgments follow a unimodal distribution in the density plot. Inconsistent judgments usually manifest as bimodal or uniform distributions. Figure 9 displays the distribution of CEM L3ers' z-scores in both L2 English and L3 Mandarin DOCs in a density plot. The area under the curve represents the probability of events, which equals 1.

Figure 9

Distribution of CEM L3ers' Judgments on the DOC in both English and Mandarin



The y-axis represents the probability density function for the kernel density estimation. The distribution of CEM L3ers' judgments of English DOC sentences is left-skewed, with the mode appearing around the higher end of the scale ($z = 1$), while their judgments of Mandarin DOC sentences show bimodality, with the two modes falling on opposite ends of the scale. This suggests that the CEM L3ers' judgments on English DOC sentences were consistent, while their judgments on Mandarin DOC sentences were inconsistent.

Analysis of the rating distribution shows that there was inter-trial variation in the CEM L3ers' ratings on the Mandarin DOC, but it does not reveal whether the cause was inter-participant variation or intra-participant inconsistency. To ascertain whether individual participants were inconsistent, the CEM L3ers were sorted based on their raw rating patterns for DOC trials in English and Mandarin: Judgments of "1" or "2" were coded as rejection, and judgments of "3" or "4" were coded as acceptance; the same rejection/acceptance performance on four or more tokens out of five was considered "consistent" (rejection or acceptance). The results in Table 22 show that 20 of the 32 CEM L3ers consistently accepted English DOC sentences, while none consistently rejected them. The CEM L3ers' judgments on the Mandarin

DOC sentences showed greater inter-participant variation: Nine consistently rejected Mandarin DOC sentences, 12 consistently accepted them, and the remaining 11 were inconsistent raters. A by-item analysis revealed that there were no individual items that were consistently accepted or rejected by the majority of CEM L3ers. No particular item received more inconsistent judgments than other items, either.

Table 22
Number of CEM L3ers Sorted by Response Patterns for English and Mandarin DOCs

English DOC	Mandarin DOC			Total
	Rejectors	Inconsistent raters	Acceptors	
Rejectors	0	0	0	0
Inconsistent raters	5	4	3	12
Acceptors	4	7	9	20
Total	9	11	12	32

Note. CEM= L1Cantonese–L2English–L3Mandarin learners; DOC = Double Object Construction.

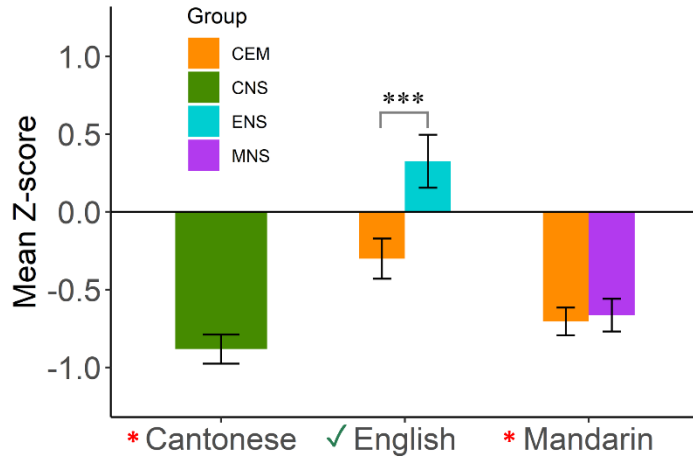
Of the nine CEM L3ers who consistently rejected the Mandarin DOC, four consistently accepted the English DOC; this indicates that *their rejection of the Mandarin DOC can be traced to transfer from L1 Cantonese*, since it could not have come from their L2 English. Of the 12 CEM participants who consistently accepted the Mandarin DOC, nine also consistently accepted the English DOC. It is unclear which is responsible for their acceptance of the Mandarin DOC: transfer from L2-English Interlanguage or positive evidence in the L3-Mandarin input.

CEM AJT results for the Mandarin POR. As reported in §6.3.2.1 (see Figure 6), CEM L3ers’ mean performance on the English POR was non-target-like due to L1 transfer, i.e., their mean *z*-score rating on the English POR was negative (see Figure 10 below).

To further explore the Mandarin POR results, I examined the response patterns from individual L3 participants who consistently accepted the English POR (target-like). It turned out that there were only four CEM L3ers who were consistent acceptors of the POR in English, and, importantly, all of them were consistent rejectors of the Mandarin POR. This suggests that *they transferred the POR from L1 Cantonese* into L3 Mandarin, not from L2-Interlanguage English.

Figure 10

Mean Ratings of the CEM L3ers (and the Native Controls) on the POR in Cantonese, English, and Mandarin

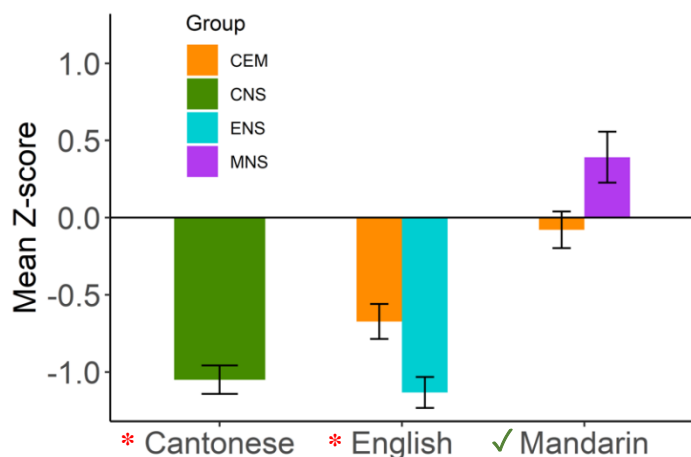


Note. Error bars represent 95% confidence intervals. CEM = L1Cantonese–L2English–L3Mandarin learners; CNS = Cantonese native speakers; ENS = English native speakers; MNS = Mandarin native speakers.

CEM AJT results for the Mandarin POT. It is worth noting that the CEM L3ers’ mean Mandarin POT z -score was very close to 0, i.e., $M = -0.07$, while that of the native Mandarin speakers was unequivocally positive ($M = 0.39$). The CEM L3ers mean POT z -score in English was unequivocally negative, as it was for the English native controls. To help make the relevant comparisons for the CEM L3ers easier to see, Figure 11 shows the CEM L3ers’ mean z -scores on the English and Mandarin POT in comparison to the mean POT z -scores of native speakers of Cantonese, English, and Mandarin, respectively.

Figure 11

Mean Ratings of the CEM L3ers (and the Native Controls) on the POT in Cantonese, English, and Mandarin



Note. Error bars represent 95% confidence intervals. CEM = L1Cantonese–L2English–L3Mandarin learners; CNS = Cantonese native speakers; ENS = English native speakers; MNS = Mandarin native speakers.

Since the mean z -score for the POT condition was close to 0 and the 95% confidence interval crossed zero, I conducted an individual analysis to see the extent of inter-participant variation. As before, those who accepted at least four of the five tokens were categorized as consistent acceptors, those who rejected at least four of the five tokens were categorized as consistent rejectors, and all those in between were categorized as inconsistent raters. The results in Table 23 show that 15 of the 32 CEM L3ers were consistent rejectors of the Mandarin POT, while 10 were consistent acceptors of it.

Table 23

Number of CEM L3ers Sorted by Response Patterns for English and Mandarin POTs

English POT	Mandarin POT			Total
	Rejectors	Inconsistent raters	Acceptors	
Rejectors	11	6	6	23
Inconsistent raters	4	1	3	8
Acceptors	0	0	1	1
Total	15	7	10	32

Note. CEM = L1Cantonese–L2English–L3Mandarin learners; POT = Passivization of the Theme in the DOC.

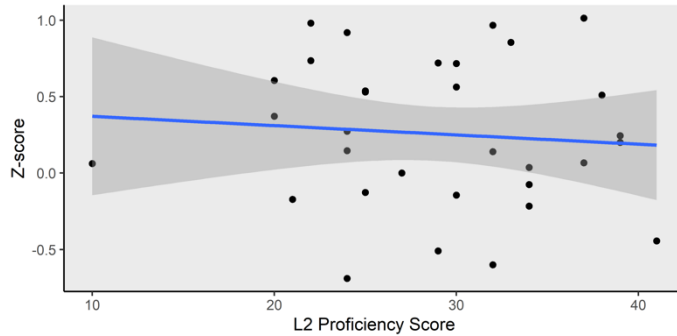
Among the 15 CEM L3ers who consistently rejected the Mandarin POT, 11 of them also consistently rejected the English POT. These 11 CEM L3ers could therefore have been transferring into Mandarin from either the L1 or L2-Interlanguage because neither their L1 Cantonese nor their L2 English allows the POT. As for the 10 CEM L3ers who consistently accepted the Mandarin POT, nine of them did not consistently accept the English POT. These nine CEM L3ers seem to have acquired the target pattern in Mandarin. The remaining seven CEM L3ers did not give consistent judgments in the Mandarin POT condition (i.e., they accepted/rejected two or three tokens), and six of them were consistent rejectors of the English POT. It is possible that these six L3ers had initially transferred their L1 or L2-Interlanguage grammar and were in the process of restructuring their L3-Interlanguage grammar in response to positive evidence in the input.

CEM: The roles of L2 proficiency and L3 proficiency. Given that one of the research questions is whether L2 proficiency plays a role in determining the source of transfer, I next examine whether L2 proficiency level was responsible for the large extent of variation observed in CEM participants' ratings for the Mandarin DOC. If L3ers with higher L2 proficiency are more likely to transfer the L2-Interlanguage grammar, we would expect a positive correlation between L2 proficiency scores (here, as measured by the English C-test) and individual mean z -scores on the Mandarin DOC.

Likewise, a positive correlation between L3 proficiency score and individual mean z -score on the Mandarin DOC would be expected on the assumption that participants (generally) perform more like native speakers as proficiency increases.

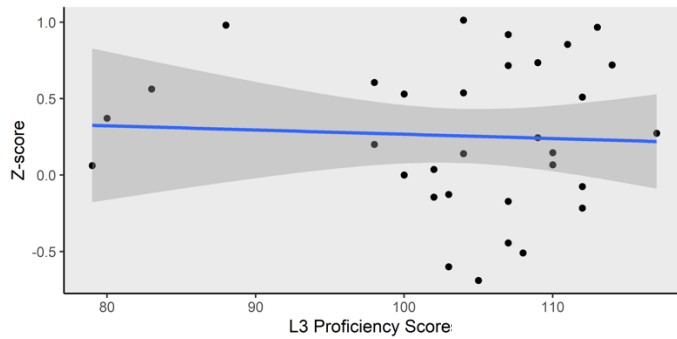
Figures 12 and 13 provide visual representations of the relationship between the CEM L3ers' individual mean z -scores on Mandarin DOC and, respectively, L2 raw proficiency scores and L3 raw proficiency scores.

Figure 12
Relation Between All CEM L3ers' Ratings on the Mandarin DOC and Their Raw L2 Proficiency Scores



Note. Each dot represents a CEM L3er. The shaded region represents 95% confidence interval.

Figure 13
Relation Between CEM L3ers' Ratings on the Mandarin DOC and Their Raw L3 Proficiency Scores



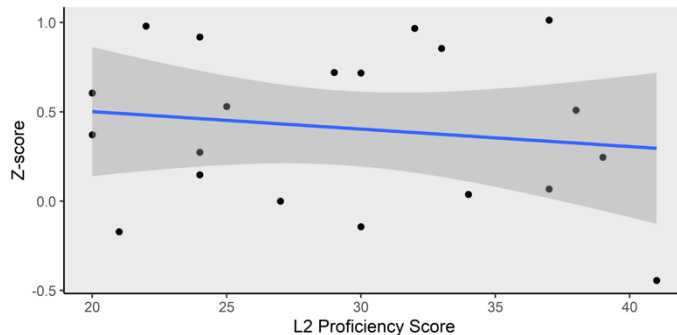
Note. Each dot represents a CEM L3er. The shaded region represents 95% confidence interval.

Two simple linear regression analyses were undertaken, and the results indicated that neither L2 proficiency (adjusted $R^2 = -0.02$, $p = .63$) nor L3 proficiency (adjusted $R^2 = -0.03$, $p = 0.76$) correlated significantly with CEM participants' individual mean z -scores on the Mandarin DOC.

Since there was variation in the learners' acceptance of the English DOC, I separated out the CEM L3ers who consistently accepted English DOC tokens ($n = 20$) to explore the relation between their L2 proficiency scores and their mean z -scores on the Mandarin DOC (see the visual representations in Figure 14).

Figure 14

Relation Between Ratings on the Mandarin DOC by CEM L3ers (Who Are Consistent Acceptors of the English DOC) and Their Raw L2 Proficiency Scores



Note. Each dot represents a CEM L3er. The shaded region represents 95% confidence interval.

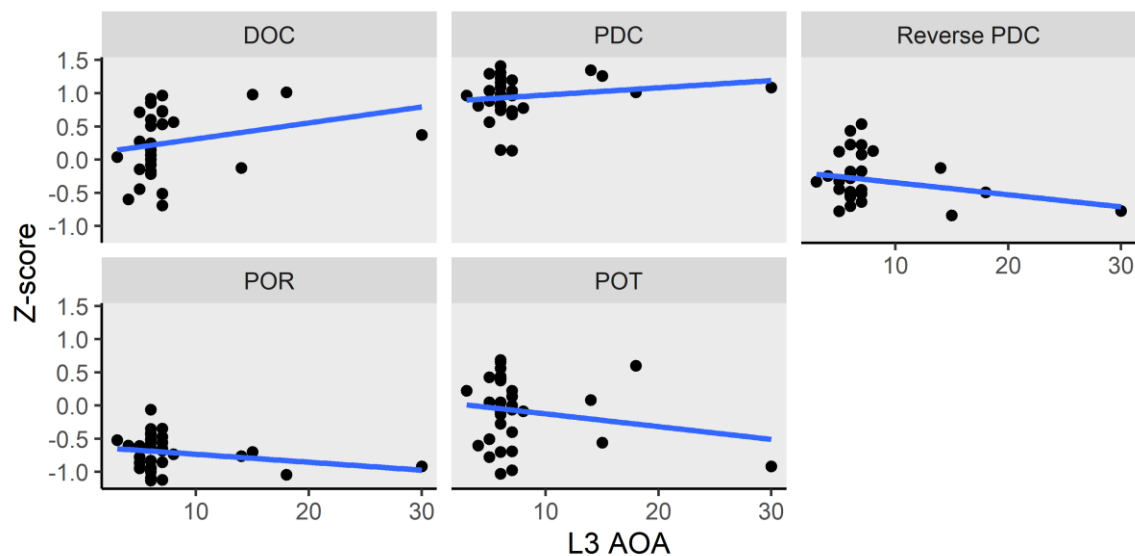
Another simple linear regression analysis was conducted to see if this CEM subgroup's L2 proficiency correlated with their z -scores on the Mandarin DOC. The results showed that the correlation was not statistically significant, either (adjusted $R^2 = -0.03$, $p = .52$).

To summarize, no significant correlation was found between L2 or L3 proficiency and the CEM L3ers' ratings on the Mandarin DOC.

CEM: The factor of L3 age of onset of acquisition (AOA). Since the CEM L3ers in this study had a wide range of L3 (Mandarin) AOAs, it is worth exploring whether the L3 AOA exerts any influence on learners' ratings in the five Mandarin conditions. Visualizations of the relation between the CEM L3ers' L3 AOA and their individual mean z -scores on the five Mandarin constructions are provided in Figure 22. Recall that the L3 AOA for four CEM L3ers' is older than 8 years, while that of all the others ranges from 3 to 7. Figure 15 shows that in all five critical conditions, the four adult CEM L3ers' mean z -scores fell within the range of the mean z -scores of the other 28 early CEM starters.

Figure 15

Relation Between CEM L3ers' L3 AOA and Their Mean Mandarin Ratings by Condition



Note. Each dot represents a CEM L3er; DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

I separated out the 28 early CEM starters and ran a series of simple linear regression analyses to examine the relation between their L3 AOA and their mean z -scores in each condition. The results revealed one positive relation that approached significance, the one between L3 AOA and mean z -scores on the Mandarin DOC (adjusted $R^2 = 0.03$, $p = .02$); this indicates that of the early CEM starters, the ones who had older L3 AOAs also happened to have more native-like responses to the Mandarin DOC sentences. Since the adjusted R^2 is very small, this weak positive correlation does not constitute compelling evidence for there being an age effect in the early CEM starters' response patterns on the Mandarin DOC.

Summary of the findings from the CEM L3ers. First, some CEM L3ers show evidence of transfer of the L1 (Cantonese) DOC and POR into the L3-Interlanguage grammar. This transfer pattern is compatible with the L1 Status Factor (L1SF) as well as with the Typological Primacy Model (TPM). Since the CEM L3ers in this study are child L2ers and a mix of child and adult L3ers, they are not the type of population discussed in the original L2 Status Factor (L2SF), which proposes, as discussed in §2.2 above, that when the L2-Interlanguage and

L3-Interlanguage are learned as explicit metalinguistic knowledge subserved by declarative memory (e.g., Paradis, 2004, 2009), the L2-Interlanguage is more likely to transfer into the L3-Interlanguage (Bardel & Sanchez, 2017). Nonetheless, one can imagine another version of the L2SF which hypothesizes that the L2-Interlanguage supersedes the L1 as the source of transfer when L2 knowledge is implicit, or more precisely, when “L2-Interlanguage grammars are epistemologically equivalent to L1 grammars” (Schwartz & Sprouse, 2021a, p. 13, fn. 10). The data from the CEM L3ers are incompatible with such a version of the L2SF. Discussion of this topic will be elaborated in Chapter 7.

Another important finding is that one third of CEM L3ers were inconsistent in their judgments of the Mandarin DOC sentences (which are grammatical). These CEM participants may have selected the L1 (where the DOC is ungrammatical) as the transfer language, and their inconsistent acceptance of the Mandarin DOC is the result of learning and restructuring in response to positive evidence in the input. Sharwood Smith and Truscott (2005) observed that in the field of L2 acquisition,

[r]esearch has repeatedly found that development consists not of an abrupt switch from one option to another or from one option to free variation to the other option but rather of a gradual shift in the frequency of each option, both being used for extended periods, as if the grammar allowed optionality (p. 230).

This apparent optionality also applies to the L3 DOC data of the CEM L3ers.

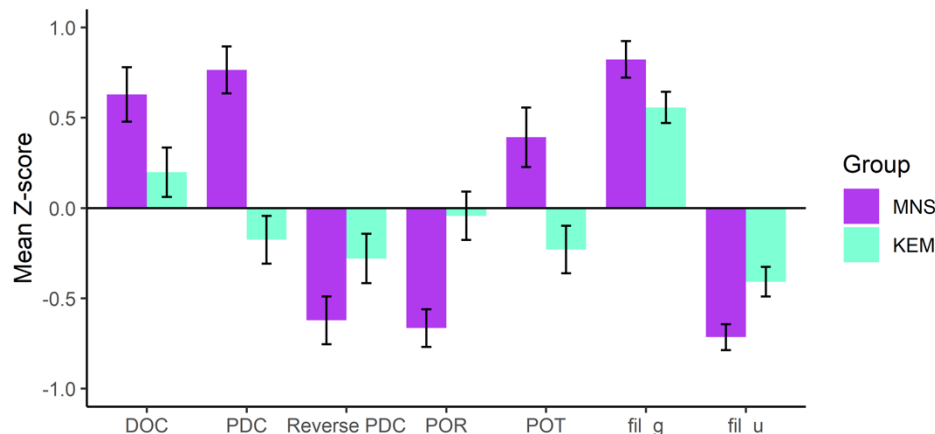
One last finding is that there was no evidence to suggest that the CEM L3ers’ L2 proficiency determines the source of transfer.

We now turn to the Mandarin AJT results of the KEM L3ers.

KEM L3ers. Figure 16 shows the KEM L3ers’ mean *z*-scores on the Mandarin AJT alongside those of the Mandarin native speakers for comparison. The KEM L3ers displayed different patterns from those of the CEM L3ers (see Figure 7). The KEM L3ers’ mean *z*-scores for all critical conditions were closer to zero, while those for the filler items were not, suggesting that the KEM L3ers found it easier to distinguish between grammatical and ungrammatical fillers

than between grammatical and ungrammatical critical items. Their mean z -score for DOC trials ($M = 0.19$) was positive but much lower than that of the native-speaker controls ($M = 0.63$).

Figure 16
Mean Ratings of the KEM L3ers (and the Native Controls) in the Mandarin AJT



Note. Error bars represent 95% confidence intervals. MNS = Mandarin native speakers; KEM = L1Korean–L2English–L3Mandarin learners; DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC; fil_g = grammatical fillers; fil_u = ungrammatical fillers.

The KEM L3ers’ mean z -score for the Reverse PDC trials ($M = -0.27$) was negative, relatively higher than that of the native-speaker controls ($M = -0.62$). For the other three conditions, the KEM L3ers had negative mean z -scores which, notably, were (very) close to zero. In particular, they had a mean z -score of -0.04 for POR trials (and the confidence interval crossed zero). Their low ratings on the POR and the POT were unlikely attributable to their degraded acceptance of the long passives in Mandarin, since their mean z -score on long monotransitive passives tested in the filler items was relatively high ($M = 0.54$).

In investigating the source of transfer, I first focus on the results for the DOC and Reverse PDC, the two constructions for which the KEM L3ers’ L1 (Korean) and L2-Interlanguage grammar behave differently.

KEM AJT results for the Mandarin DOC. The DOC is not allowed in KEM L3ers’ L1 (Korean), but it is allowed in their L2 (English) as well as in their L3 (Mandarin).

To explore the extent to which ratings given by the KEM and MNS groups varied on the DOC trials in the Mandarin AJT, I fit the z -score data to a mixed effects linear regression model, with fixed effects for *Group* (MNS vs. KEM) and with a random effect for *Item*. The summary of the model is provided in Table 24.

Table 24

Results of the Linear Mixed Effects Model for Judgments on the Mandarin DOC by KEM L3ers and Mandarin Native Speakers

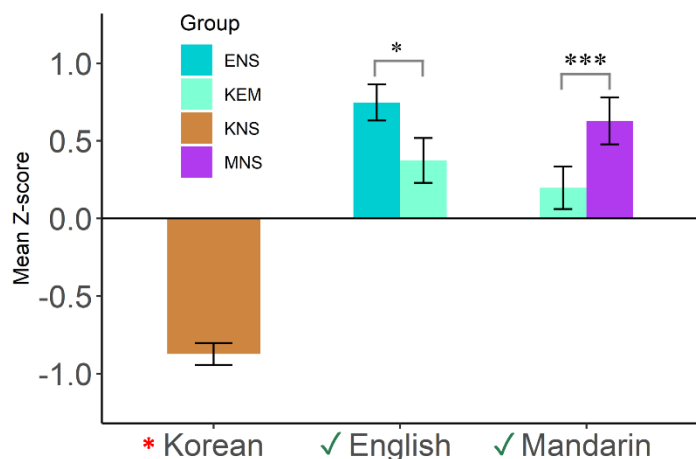
Fixed effects	β	SE	t	p	
Intercept (Ref: MNS, DOC)	0.64	0.13	4.99	<.001	***
KEM	-0.45	0.15	-2.91	.005	**

Note. Formula (lmer): $z\text{-scores} \sim \text{group} + (1 + \text{group} | \text{item})$. MNS = Mandarin native speakers; DOC = Double Object Construction; KEM = L1Korean–L2English–L3Mandarin learners.

For easy comparison, Figure 17 shows group mean z -scores on the English and Mandarin DOC for KEM L3ers alongside the native-speaker group mean z -scores on the DOC in, respectively, Korean, English, and Mandarin. KEM L3ers rated the Mandarin DOC significantly lower than Mandarin native speakers did ($\beta = -0.45$, $t = -2.91$, $p = .005$), which is suggestive of L1 transfer, because only the KEM L3ers' L1 (Korean) does not allow the DOC.

Figure 17

Mean Ratings of the KEM L3ers (and the Native Controls) on the DOC in Korean, English, and Mandarin



Note. DOC = Double Object Construction; ENS = English native speakers; KEM= L1Korean–L2English–L3Mandarin learners; KNS = Korean native speakers; MNS = Mandarin native speakers.

To further investigate whether there is inter-participant variation, I tabulated the KEM L3ers by their response patterns (i.e., consistent acceptors, inconsistent rater, or consistent rejector) for DOC trials in both English and Mandarin in order to examine whether their L3-Interlanguage grammar is transferred from the L2-Interlanguage. The results for DOC trials can be found in Table 25. Recall that consistency is defined as raw rating of either “1”/“2” (i.e., unacceptable) or “3”/“4” (i.e., acceptable) for at least four tokens (out of five) per condition.

Table 25

Number of KEM L3ers Sorted by Response Patterns for the English and Mandarin DOCs

English DOC	Mandarin DOC			Total
	Rejectors	Inconsistent raters	Acceptors	
Rejectors	3	1	1	5
Inconsistent raters	0	4	7	11
Acceptors	6	5	7	18
Total	9	10	15	34

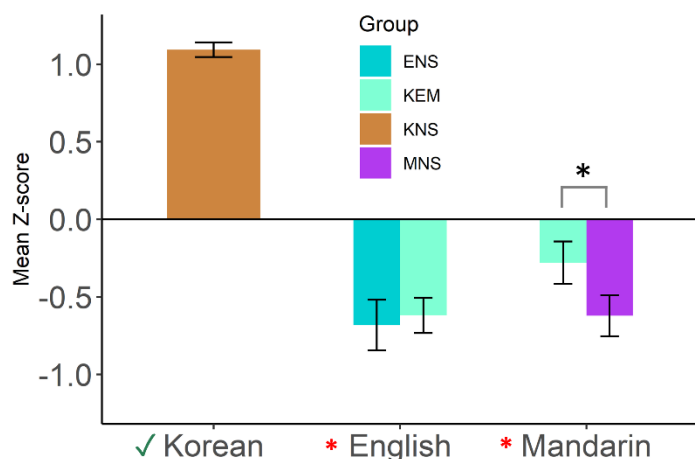
Note. KEM= L1Korean–L2English–L3Mandarin learners; DOC = Double Object Construction.

In general, inter-participant variation among the KEM L3ers was greater in Mandarin than in English. Approximately half of the KEM L3ers (i.e., 18 out of 34) consistently accepted English

DOC trials, and a slightly smaller proportion of them (i.e., 15 out of 34) consistently accepted Mandarin DOC trials. Among the 18 KEM L3ers who consistently accepted the English DOC, six of them consistently rejected the Mandarin DOC. This constitutes evidence for *L1 transfer into the L3-Interlanguage*, because these six KEM L3ers' L2-Interlanguage English has the DOC and Mandarin (L3) input has the DOC, but only Korean (L1) disallows the DOC.

KEM AJT results for the Mandarin Reverse PDC. In contrast to the DOC, the Reverse PDC is allowed in the L1 (Korean) but disallowed in target-L2 English as well as in target-L3 Mandarin. KEM L3ers' mean z-scores on the English and Mandarin Reverse PDC were both negative, but their mean rating was higher on the Mandarin Reverse PDC, as shown in Figure 18.

Figure 18
Mean Ratings of the KEM L3ers (and the Native Controls) on the Reverse PDC in Korean, English, and Mandarin



Note. PDC = Prepositional Dative Construction; ENS = English native speakers; KEM = L1Korean–L2English–L3Mandarin learners; KNS = Korean native speakers; MNS = Mandarin native speakers.

A mixed effects linear regression analysis was performed to assess the difference between the KEM L3ers and the Mandarin native speakers with respect to their mean ratings on the Mandarin Reverse PDC. Table 26 summarizes the results. The difference emerged as statistically significant ($\beta = 0.36, t = 2.50, p = .01$), which indicates that the KEM L3ers as a

group rated the Mandarin Reverse PDC reliably higher than the Mandarin native speakers did. Since the Reverse PDC is allowed in the KEM L3ers' L1 Korean and prohibited in both their L2-Interlanguage (English) and the L3 (Mandarin), this result is suggestive of L1 transfer.

Table 26

Results of the Linear Mixed Effects Model for Judgments on the Mandarin Reverse PDC by KEM L3ers and Mandarin Native Speakers

Fixed effects	β	SE	t	p	
Intercept (Ref: MNS)	-0.63	0.10	-5.43	<.001	***
KEM	0.36	0.14	2.50	0.01	*

Note. Formula (lmer): z -scores \sim group + (1 + group | item). MNS = Mandarin Native Speakers; KEM = L1Korean–L2English–L3Mandarin learners.

To further explore this issue of L1 transfer from Korean, we turn to analysis by individuals. Table 27 displays the results of the KEM L3ers tabulated by their response patterns for the Reverse PDC in English and Mandarin. Twenty-seven KEM L3ers consistently rejected English Reverse PDC trials, but only 18 consistently rejected Mandarin Reverse PDC trials.

Table 27

Number of KEM L3ers Sorted by Response Patterns for the English and Mandarin Reverse PDCs

English Reverse PDC	Mandarin Reverse PDC			Total
	Rejectors	Inconsistent raters	Acceptors	
Rejectors	13	12	2	27
Inconsistent raters	5	1	0	6
Acceptors	0	1	0	1
Total	18	14	2	34

Note. KEM = L1Korean–L2English–L3Mandarin learners; PDC = Prepositional Dative Construction.

Among the 27 KEM L3ers who consistently rejected the English Reverse PDC, two of them consistently accepted the Mandarin Reverse PDC, which is non-target-like; ***this result is indicative of L1 transfer***, because only Korean (L1) allows the Reverse PDC. Thirteen of the 27 KEM L3ers consistently rejected Mandarin Reverse PDC tokens. There are two possible reasons for these L3ers' target-like performance: (a) L2-Interlanguage transfer or (b) acquisition of the

ungrammaticality of the Reverse PDC in Mandarin. For the latter possibility, the question is how it comes to arise, since there is no positive evidence in the input. One possibility is that the learners rely on (indirect) negative evidence.

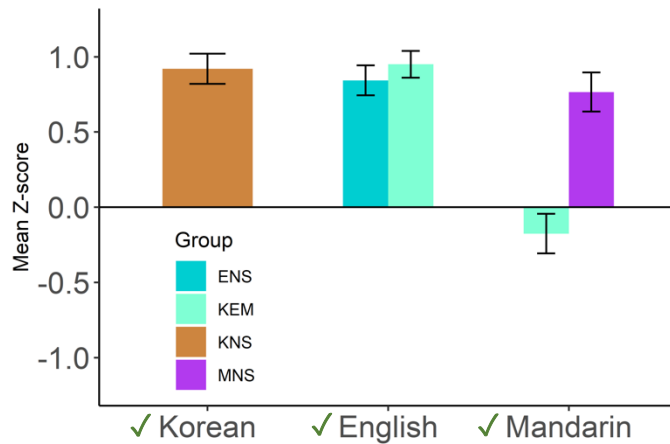
We next turn to the KEM results of the other three properties.

KEM AJT results for the Mandarin PDC. The KEM L3ers' low mean *z*-score for the Mandarin PDC is unexpected, since the PDC is a shared property among their L1 (Korean), target-L2 (English), and target-L3 (Mandarin). Indeed, their rating of the English PDC is very high (see Figure 19). Individual analysis shows that 12 of the KEM L3ers consistently rejected the Mandarin PDC and only three consistently accepted it (which could be due to transfer).

The virtual absence of transfer in the Mandarin PDC condition might suggest that the KEM L3ers did not treat the Mandarin PDC as the equivalent of the PDC in Korean and English. As reviewed in Chapter 3, there is debate on the status of the *gei* in the Mandarin PDC, i.e., preposition or verb. The KEM L3ers might have been treating *gei* in the Mandarin PDC as a verb rather than as a preposition. Note that the CEM L3ers had no problem accepting the Mandarin PDC, probably because Cantonese has *bei* “give,” which is the equivalent of Mandarin *gei* “give” in the PDC (including what their status is in the PDC).

Figure 19

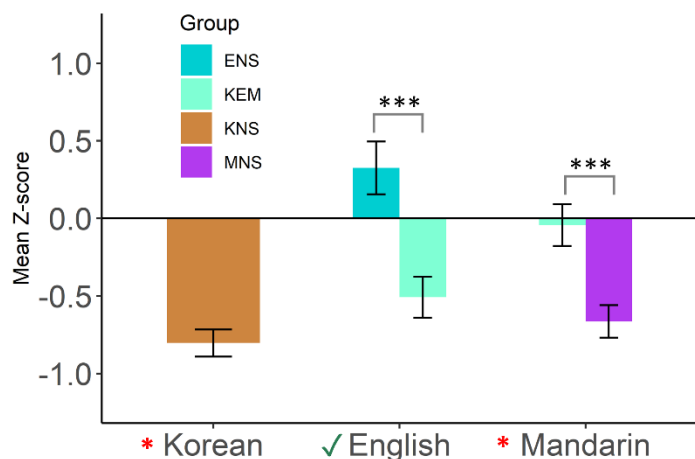
Mean Ratings of the KEM L3ers (and the Native Controls) on the PDC in Korean, English, and Mandarin



KEM AJT results for the Mandarin POR. Let us look at the KEM results in the POR condition. Recall that the POR is ungrammatical in the L1 (Korean) and the L3 (Mandarin) but grammatical in the L2 (English). However, the KEM L3ers' mean z -score rating on the English POR was low and negative, as shown in Figure 20, possibly due to persistent L1 transfer. Moreover, the KEM L3ers' mean rating on the Mandarin POR was very close to zero, and the 95% confidence interval crossed zero.

Figure 20

Mean Ratings of the KEM L3ers (and the Native Controls) on the POR in Korean, English, and Mandarin



Note. POR = Passivization of the Recipient in the Double Object Construction; ENS = English native speakers; KEM= L1Korean–L2English–L3Mandarin learners; KNS = Korean native speakers; MNS = Mandarin native speakers.

An individual analysis revealed that eight of the 34 KEM L3ers consistently accepted the Mandarin POR, while eight others consistently rejected it; the remaining 18 were inconsistent raters (see Table 28).

Table 28

Number of KEM L3ers Sorted by Response Patterns for the English and Mandarin PORs

English POR	Mandarin POR			Total
	Rejectors	Inconsistent raters	Acceptors	
Rejectors	6	11	6	23
Inconsistent raters	2	6	1	9
Acceptors	0	1	1	2
Total	8	18	8	34

Note. KEM= L1Korean–L2English–L3Mandarin learners; POR = Passivization of the Recipient in the Double Object Construction.

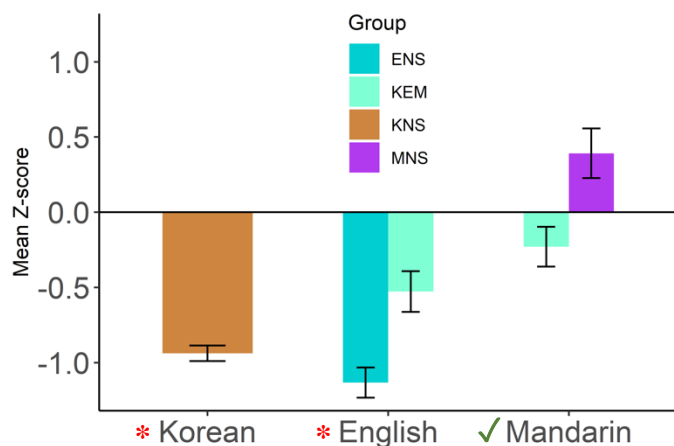
Among the eight KEM L3ers who consistently accepted the ungrammatical Mandarin POR trials, one also consistently accepted grammatical English POR tokens; *this could be evidence of L2-Interlanguage English transfer*, since neither Korean (L1) nor Mandarin (L3) allows POR, but is arguably an outlier since it is unique. As for the remaining seven KEM L3ers, however,

their non-target-like acceptance of the Mandarin POR is not a result of transfer from either the L1 or the L2-Interlanguage, since neither Korean (L1) nor their L2-Interlanguage allows this construction. It is thus unclear why these seven KEM L3ers accepted the Mandarin POR.

On the other hand, of the eight KEM L3ers who consistently rejected the Mandarin POR, six also consistently rejected the English POR. It is unclear, then, whether these learners' target-like performance here is the result of transfer from the L1 (Korean) or from their L2-Interlanguage English.

KEM AJT results for the Mandarin POT. The grammaticality of the POT also varies across the languages included in this study: It is ungrammatical in both Korean (L1) and English (L2) and grammatical in Mandarin (L3). As shown in Figure 21, the KEM L3ers' mean *z*-score rating on the English POT was low and negative ($M = -0.52$), and their mean *z*-score for the Mandarin POT was higher but still negative ($M = -0.22$).

Figure 21
Mean Ratings of the KEM L3ers (and the Native Controls) on the POT in Korean, English, and Mandarin



Note. POT = Passivization of the Theme in the Double Object Construction; ENS = English native speakers; KEM= L1Korean–L2English–L3Mandarin learners; KNS = Korean native speakers; MNS = Mandarin native speakers.

An individual analysis was conducted to examine inter-participant variation of the KEM L3ers' ratings on the POT in English and Mandarin (see the results in Table 29).

Table 29**Number of KEM L3ers Sorted by Response Patterns for the English and Mandarin POTs**

English POT	Mandarin POT			
	Rejectors	Inconsistent raters	Acceptors	Total
Rejectors	13	7	3	23
Inconsistent raters	4	2	0	6
Acceptors	0	3	2	5
Total	17	12	5	34

Note. KEM= L1Korean–L2English–L3Mandarin learners; POT = Passivization of the Theme in the Double Object Construction.

Twenty-three of the KEM L3ers consistently rejected the English POT, and five consistently accepted it. As for the Mandarin POT, 17 KEM L3ers consistently rejected the Mandarin POT; and of these, there were 13 who consistently rejected the POT in both English and Mandarin. These 13 KEM L3ers' non-target-like rejection of the Mandarin POT is indicative of transfer, but the source of it is unclear because the POT is ungrammatical in both their L1 (Korean) and their L2-Interlanguage (English).

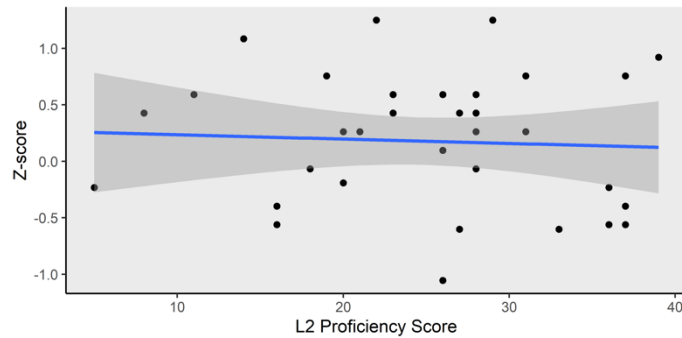
KEM: The roles of L2 proficiency and L3 proficiency. Since there is substantial individual variation in KEM L3ers' ratings on the DOC and Reverse PDC in Mandarin, it is worth exploring whether performance on these two conditions correlated with L2 proficiency and/or L3 proficiency.

Let us start with the DOC. Scatterplots were made—see Figures 22 and 23—to visualize the relationship between KEM L3ers' raw L2 and L3 proficiency scores and their individual mean z-scores on the Mandarin DOC. On the hypothesis that L3ers with higher L2 proficiency are more likely to transfer their L2-Interlanguage grammar into the L3, a positive correlation is expected between L2 proficiency scores and individual mean z-scores on the Mandarin DOC.

Similarly, if L3ers' ratings on the Mandarin DOC become more target-like as L3 proficiency increases, the correlation between L3 proficiency scores and individual z-scores on the Mandarin DOC is also expected to be positive.

Figure 22

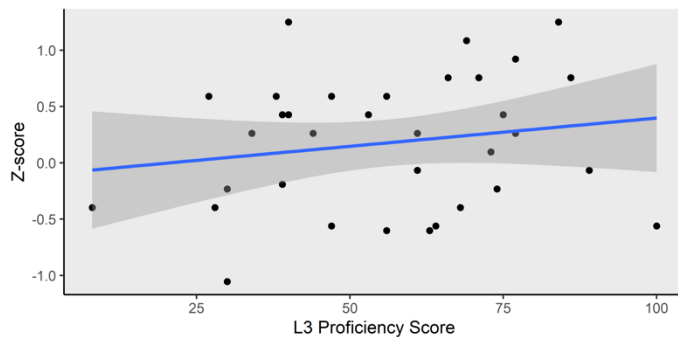
Relation Between KEM L3ers' Ratings on the Mandarin DOC and Their Raw L2 Proficiency Scores



Note. Each dot represents a KEM L3er. Shaded region represents 95% confidence interval.

Figure 23

Relation Between KEM L3ers' Ratings on the Mandarin DOC and Their Raw L3 Proficiency Scores



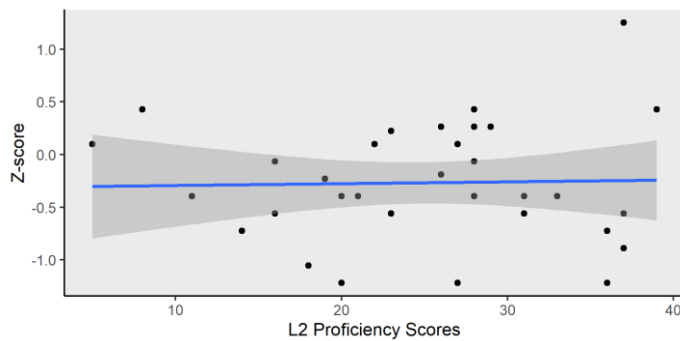
Note. Each dot represents a KEM L3er. Shaded region represents 95% confidence interval.

The results of two simple linear regression analyses indicated that there is no statistically significant correlation between KEM L3ers' individual mean z -scores on the Mandarin DOC and either their raw L2 proficiency scores (adjusted $R^2 = -0.02$, $p = .75$) or their raw L3 proficiency scores (adjusted $R^2 = 0.002$, $p = .31$).

As for the Mandarin Reverse PDC, on the hypothesis that L3ers with higher L2 proficiency are more likely to transfer their L2-Interlanguage grammar into the L3, a negative correlation is expected between L2 proficiency scores and individual mean z -scores. No statistically significant relationship was found between the KEM L3ers' raw L2 proficiency scores and their individual mean z -scores on the Mandarin Reverse PDC (adjusted $R^2 = -0.03$,

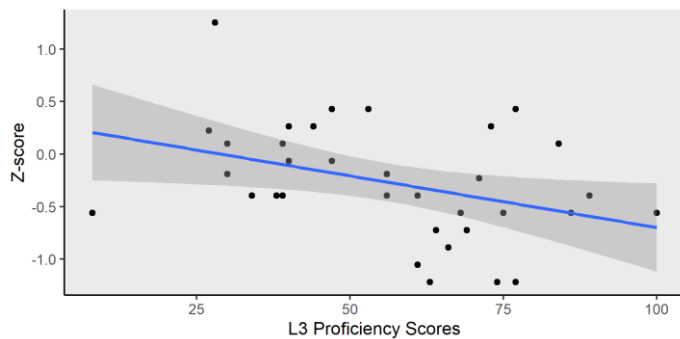
$p = .88$)—see Figure 24—but there was a marginally significant negative correlation between their raw L3 proficiency scores (adjusted $R^2 = 0.11$, $p = .03$) and their Mandarin Reverse PDC z -scores, as seen in Figure 25. This suggests that as L3 proficiency increases, the KEM L3ers' ratings on Mandarin Reverse PDC trials decreased, which is more target-like, since the Reverse PDC is ungrammatical in Mandarin.

Figure 24
Relation Between KEM L3ers' Ratings on the Mandarin Reverse PDC and Their Raw L2 Proficiency Scores



Note. Each dot represents a KEM L3er. The shaded region represents 95% confidence interval.

Figure 25
Relation Between KEM L3ers' Ratings on the Mandarin Reverse PDC and Their Raw L3 Proficiency Scores

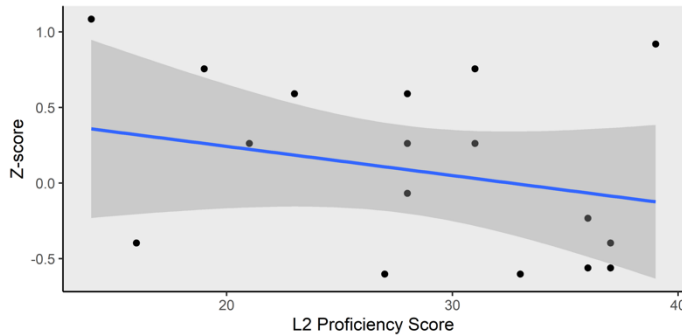


Note. Each dot represents a KEM L3er. The shaded region represents 95% confidence interval.

Since some KEM L3ers' judgments on the English DOC and Reverse PDC were inconsistent, I separated out the groups of KEM L3ers whose performance was target-like on the English DOC and on the English Reverse PDC, i.e., those who consistently accepted the English DOC

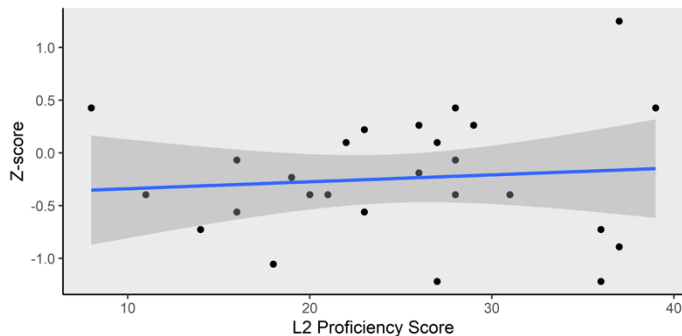
($n = 18$) and those who consistently rejected the English Reverse PDC ($n = 27$), and examined whether L2 proficiency influenced their z -score ratings in those conditions. No statistically significant relationship was found between the raw L2 proficiency scores and the ratings on either the Mandarin DOC (adjusted $R^2 = -0.007$, $p = .87$) or the Reverse PDC trials (adjusted $R^2 = -0.005$, $p = .98$) among these subgroups of KEM L3ers; see Figures 26 and 27. These results suggest that L2 proficiency (as measured by the participants' scores on the English C-test) did not influence the L3ers' ratings on the Mandarin DOC or the Mandarin Reverse PDC.

Figure 26
Relation Between Ratings on the Mandarin DOC by KEM L3ers (Who Are Consistent Acceptors of the English DOC) and Their Raw L2 Proficiency Scores



Note. Each dot represents a KEM L3er. The shaded region represents 95% confidence interval.

Figure 27
Relation Between Ratings on the Mandarin Reverse PDC by KEM L3ers (Who Are Consistent Rejectors of the English PDC) and Their Raw L2 Proficiency Scores



Note. Each dot represents a KEM L3er. The shaded region represents 95% confidence interval.

Summary of the findings from the KEM L3ers. Six KEM L3ers transferred the ungrammaticality of the DOC from their L1 (Korean) to L3 (Mandarin), and two KEM L3ers transferred the grammaticality of the Reverse PDC from L1 (Korean) to L3 (Mandarin), providing evidence for the L1SF. On the other hand, a single KEM L3er transferred the POR from L2-Interlanguage English into the L3-Interlanguage. No evidence was found to suggest that L2 proficiency level influences the KEM L3ers' transfer source.

6.4 Summary of the chapter

This chapter first described the methods used in scoring the English and Mandarin proficiency tests and the criteria used for determining the outliers as well as the z -score transformation used for the AJT data. It then presented CEM and KEM L3ers' scores on the English and Mandarin proficiency tests. Both the CEM and KEM L3ers had a wide range of English proficiency levels, and they were (unfortunately) not absolute beginning learners of Mandarin.

What followed next were the results of the AJTs. AJT results of the native English, Cantonese, Korean, and Mandarin speakers confirmed, as described in the literature, the (un)acceptability of the DOC, PDC, Reverse PDC, POR, and POT in the four languages. CEM and KEM L3ers' performance on the English AJT showed evidence of L1 transfer into the L2-Interlanguage on the POR. Detailed individual analyses of the Mandarin AJT results from the CEM and KEM L3ers suggest L1 transfer into the L3-Interlanguage grammar, which is compatible with the L1SF and the TPM.

In the following chapter, I synthesize the findings from the CEM and KEM L3ers' performance on the AJTs to address the research questions regarding the L1SF vs. the L2SF, the role of the L2 proficiency, and the debate on wholesale vs. property-by-property transfer. Chapter 7 ends with some suggestions for possible research avenues related to this dissertation.

Chapter 7. General Discussion, Conclusion, and Future Directions

This chapter begins with a summary of the general findings (§7.1). It then addresses the three research questions concerning the debate on the source of transfer (§7.2), the role of L2 proficiency (§7.3), and the debate on wholesale vs. property-by-property transfer (§7.4). Section §7.5 points out limitations of this study, and the final section suggests directions for future work.

7.1 Summary of findings

This dissertation contributes new data to the debate on the source and manner of transfer in L3 acquisition by examining ditransitives and Passivization of the Recipient and Theme in the Double Object Construction (DOC) in L3 Mandarin. Two groups of L3 Mandarin learners who shared the same L2 (English) but differed in their L1 were tested in the study, namely L1Cantonese–L2English–L3Mandarin (CEM) learners ($n = 32$) and L1Korean–L2English–L3Mandarin (KEM) learners ($n = 34$). In addition, groups of native speakers of the four languages involved—i.e., Cantonese, English, Korean, and Mandarin—were tested on the linguistic phenomena under investigation in their native language.

Native speakers' judgments confirmed the (un)acceptability of the five linguistic phenomena described in the literature (see Table 30).

Table 30

Similarities and Differences Among English, Cantonese, Korean, and Mandarin

	DOC	PDC	Reverse PDC ^a	POR	POT
English (L2)	✓	✓	x	✓	x
Cantonese (L1)	x	✓	x	x	x
Korean (L1)	x ^b	✓	✓	x	x
Mandarin (L3)	✓	✓	x	x	✓

Note. DOC = Double Object Construction; PDC = Prepositional Dative Construction; POR = Passivization of the Recipient in the DOC; POT = Passivization of the Theme in the DOC.

^aThe Reverse PDC refers to the V + PP_R + NP_T pattern, which corresponds to the canonical [PP_{RECIPIENT}-Dat NP_{THEME}-Acc] construction in Korean.

^bThis pattern is possible with only a very limited number of verbs.

English native speakers accepted the DOC, the Prepositional Dative Construction (PDC), and Passivization of the Recipient (POR) in the DOC, while rejecting the Reverse PDC and Passivization of the Theme (POT) in the DOC. Cantonese native speakers accepted the PDC and rejected all the other four constructions. Korean native speakers accepted the PDC and the Reverse PDC and rejected the other three constructions. Mandarin native speakers rejected the Reverse PDC and the POR and accepted the other three constructions.

The L3ers' performance shows signs of L1 transfer. It is also characterized by inter-participant variation and intra-participant inconsistency. For the DOC—which Cantonese and Korean disallow but English and Mandarin allow—both the CEM group and KEM group accepted the English DOC, but they had lower mean acceptance scores on the Mandarin DOC than the native speakers did. Individual analyses showed that four (of the 32) CEM L3ers and six (of the 34) KEM L3ers consistently accepted the DOC in English (L2) while consistently rejecting the DOC in Mandarin (L3) (where consistency is defined as raw ratings of either “1”/“2” (i.e., unacceptable) or “3”/“4” (i.e., acceptable) for at least four tokens per condition); these data constitute clear evidence of L1 transfer into the L3-Interlanguage, because their L2-Interlanguage English has the DOC and their L3 (Mandarin) input has the DOC, and *only Cantonese (L1) and Korean (L1) disallow the DOC*.

As for the PDC, which is a shared property among the four languages, the CEM L3ers performed target-like in accepting both the English and Mandarin PDC, whereas the KEM L3ers (as a group) accepted the English PDC but rejected the Mandarin PDC. Here, lack of transfer among the majority of KEM L3ers suggests, arguably, that they do not treat the Mandarin PDC as the equivalent of the Korean PDC or the English PDC; these L3ers might have treated *gei* in the Mandarin PDC as a verb (with the meaning of “give”) rather than as a preposition.

In terms of the Reverse PDC, which is grammatical in only Korean (L1), the CEM and KEM L3ers rejected this pattern in English and Mandarin at the group level; but two of the KEM L3ers consistently rejected the English Reverse PDC while accepting the Mandarin Reverse PDC, which is indicative of L1 transfer, because *only the Korean (L1) allows the Reverse PDC*. Thirteen of the KEM L3ers consistently rejected the Reverse PDC in both English and Mandarin; it is not possible to determine whether the L3ers' target-like rejection of the (ungrammatical) Mandarin Reverse PDC resulted from L2-Interlanguage transfer or from acquisition of the construction (based, presumably, on indirect negative evidence).

Turning to the POR, a pattern that only English allows, CEM and KEM L3ers rejected the English POR at the group level, suggestive of L1 transfer to the L2-Interlanguage. Four CEM L3ers consistently accepted the English POR while consistently rejecting the Mandarin POR, suggesting transfer from the L1 (Cantonese) into the L3-Interlanguage, because *Cantonese (L1) disallows the POR*. Only one KEM L3er consistently accepted the POR in both English and Mandarin, compatible with transfer from the L2-Interlanguage but more likely a spurious result.

The POT is allowed in only Mandarin. Both groups of L3ers rejected this pattern in English, but their judgments in Mandarin showed greater inter-participant variation and intra-participant inconsistency. In particular, among the 32 CEM L3ers, 10 consistently accepted the Mandarin POT, which is target-like, while 15 consistently rejected it, and the remaining seven were inconsistent in their judgments. Similarly, among the 34 KEM L3ers, 17 consistently rejected the Mandarin POT, while only five consistently accepted it, and the remaining 12 were inconsistent in their judgments. It is unclear whether the CEM and KEM L3ers' rejection of the Mandarin POT is the result of L1 transfer or L2-Interlanguage transfer, because both the L1 (Cantonese and Korean) and their L2-Interlanguage (English) disallow the POT.

7.2 The source of transfer

One of the major research questions of this dissertation concerns the source of transfer in L3 acquisition. In particular, this study was designed to test two competing hypotheses on this: the L1 Status Factor (L1SF) vs. the L2 Status Factor (L2SF). The results from the CEM L3ers provide unambiguous evidence of L1 transfer of the DOC, but no unambiguous evidence of L2-Interlanguage transfer. The results from the KEM L3ers also provide unambiguous evidence of L1 transfer of the DOC and Reverse PDC, with one exception of a KEM L3er who exhibited evidence of L2-Interlanguage transfer of the POR into the L3-Interlanguage. This KEM L3er may be an outlier and no generalization can be made out of this one participant's performance on a single phenomenon.

The results from the CEM L3ers (DOC and POR) and KEM L3ers (DOC and Reverse PDC) both argue against the L2SF. The original version of the L2SF (e.g., Bardel & Falk, 2007) hypothesizes that the L2-Interlanguage is the source of transfer in adult L3 acquisition on the assumption that the L2 and L3 are learned explicitly and subserved by declarative memory (Sánchez & Bardel, 2017), unlike in L1 acquisition. Another version contests their assumption

that (even adult) L2 acquisition necessarily arises as the result of metalinguistic knowledge; with this as the starting point, it is possible that “L2-Interlanguage grammars [that] are epistemologically equivalent to L1 grammars” (Schwartz & Sprouse, 2021a, p. 13, fn. 10) supersede L1 grammars as the source of transfer. The evidence of L1 transfer from the CEM and KEM L3ers argues against both versions of the L2SF. In other words, regardless of whether the L2 is acquired in (early) childhood or adulthood, the L2-Interlanguage is not adopted as the transfer language in these data.

To synthesize, the transfer patterns that emerged in the CEM and KEM learners of this study are compatible with the L1SF but argue against the L2SF. In addition, the transfer patterns are also compatible with another model reviewed in Chapter 2—the Typological Primacy Model (TPM; e.g., Rothman, 2011). The TPM proposes that the transfer language is the one which is perceived to be more structurally/typologically similar to the L3-target language (TL). It is unsurprising that CEM L3ers demonstrated clear L1 (Cantonese) transfer, since Cantonese is undoubtedly more similar to Mandarin than English is. Unfortunately, there is no way to decide between the L1SF and the TPM without a mirror-image design; in such a set-up, the target L3 is held constant, and the L1 and L2 swap order between the two L3 groups (and, as observed by Schwartz & Sprouse, 2021a, p. 19, both L3 groups are very advanced in their L2). Under these conditions, the TPM predicts that the same language will be the transfer language, be it the L1 or the L2.

7.3 The role of L2 proficiency

In addition to the L1 status vs. L2 status and (perceived) structural similarity, other factors have been considered to influence the source of transfer, such as L2 proficiency (e.g., Arıbaş & Cele, 2021; Sánchez & Bardel, 2017). A very limited number of studies have looked at the role(s) that L2 proficiency may play.

Arıbaş and Cele (2021) found that the higher the L2 proficiency, the more likely the transfer from the L2-Interlanguage at initial stages of L3 acquisition, in this case when the L2-TL and the L3-TL match with respect to the phenomena in question. They recruited 23 beginning L1Turkish–L2German–L3English learners and 39 beginning Turkish L2ers of English and had them complete a ternary forced-choice task to examine their acquisition of English articles. Fourteen L3ers had A1 (beginner) level German proficiency, and nine had B1 (pre-intermediate)

level German proficiency (as measured by standardized exams). Participants were asked to choose between *a*, *the*, and the null article to complete sentences in four different contexts (10 items per context): definite-specific, definite-non-specific, indefinite-specific, and indefinite-non-specific. English and German distinguish articles on the basis of definiteness (but not specificity), while Turkish is an article-less language. The L3 group was significantly more accurate than the L2 group in providing appropriate articles in the four contexts, suggestive of transfer from L2 German. Moreover, the L3ers with higher proficiency in the L2 also had significantly higher accuracy scores than those with lower L2 proficiency. One limitation of this study is that an article system is not a particularly good phenomenon to investigate since it is presumably the subject of intensive instruction, and the participants may have been using their metalinguistic knowledge in providing the judgments.

Sánchez and Bardel (2017), by contrast, found that the lower the L2 proficiency, the more likely the transfer from the L2-Interlanguage at initial stages of L3 acquisition, this time when the L2-TL and the L3-TL do not match with respect to the property in question. They collected written English narratives from 73 Spanish/Catalan bilinguals who learned German as their L2 and English as their L3. The L3ers were divided into three L2 proficiency levels according to the scores they received on a standardized German proficiency test. Twenty-one of them were placed in the low group, 33 in the intermediate group, and 19 in the high group. To control for the potentially confounding factor of L3 proficiency, the L3ers also completed a standardized English proficiency test and were subsequently classified into three proficiency levels in English. The linguistic phenomenon under investigation was verb placement. Spanish, Catalan, and English are VO languages, while German is OV and requires the finite verb to be the second constituent in main clauses. The authors focused their analysis of transfer on identifying main and embedded clauses in English where the verb was placed at the end of the clause, such as the example in (56). Such errors are attributed to transfer from German, because only German is OV.

(56) Charlot is in the Cafeteria *going*.

(Sánchez & Bardel, 2017, p. 236, (9))

A total of 72 verb-final clauses were identified in the L3ers' written narratives (out of how many clauses in total is not mentioned). The authors subjected the data to an Analysis of Covariance (ANCOVA), with L2 proficiency as the independent variable and L2 transfer (as measured by the number of verb-final clauses produced) as the dependent variable, along with biological age and L3 proficiency as covariates. The results of the model revealed a statistically significant difference in the number of verb-final clauses produced by the different L2 proficiency groups when the covariates were adjusted. In particular, 48.6% of the verb-final clauses were produced by the low group, 47.2% by the intermediate group, and only 4.2% by the high group. The authors concluded that the incidence of L2 transfer decreases as L2 proficiency increases.

One limitation of both of these studies is that the L3ers were not tested on the linguistic phenomena under investigation in their L2-Interlanguage. As the current L3 Mandarin study amply demonstrates, the L3ers' L2-Interlanguage grammar does not necessarily converge on the target grammar. In light of the (sparse) contradictory findings in the literature, this dissertation set out to further investigate the role L2 proficiency plays in determining the source of transfer.

As reported in Chapter 6, no significant correlation was found between the L2 proficiency of the CEM and KEM L3ers and their judgment patterns in the Mandarin AJT. One major difference in methodology between this study and the two studies just reviewed is the measurement of L2 proficiency. This study used a C-test, while those two used standardized proficiency tests. It is possible that the C-test used in this study is not as effective as standardized proficiency tests in measuring learners' proficiency. In addition, the previous two studies treated proficiency as a categorical variable, i.e., they divided the learners into different proficiency levels by using arbitrary cut-off points of the proficiency scores, while this study treated proficiency as a continuous variable. However, if proficiency really plays a role in influencing learners' performance, theoretically these two analysis methods should yield the same results. More research is needed on the effect of L2 proficiency and transfer in L3 acquisition.

7.4 Wholesale vs. property-by-property transfer

Another research goal of this dissertation was to test wholesale vs. property-by-property transfer hypotheses. The current study took up Miller and Iverson's (2021) suggestion to test the same group of L3ers on multiple linguistic properties to see whether there is undisputable evidence against wholesale transfer, that is, evidence of transfer from language A for one

linguistic phenomenon and from language B for another linguistic phenomenon. In terms of the CEM L3 results, there was no unambiguous evidence for property-by-property transfer, since the source of transfer for both the DOC and the POR is the L1. In terms of the KEM L3 results, even though some learners showed unambiguous evidence of L1 transfer on two properties (the DOC and the Reverse PDC) and one learner showed suggestive evidence of L2-Interlanguage transfer on another property (the POR), they were different L3ers; it is not the case that *the same learner* transferred the DOC and the Reverse PDC from the L1 but the POR from the L2-Interlanguage. In short, this study did not find any evidence for property-by-property transfer, and hence the results are compatible with the wholesale transfer hypothesis.

7.5 Limitations

This dissertation faces the same challenges that are not uncommon in the emergent field of L3 acquisition and has its own limitations. First, the sample size of this research is small due to limited time and resources. As a result, the dissertation focuses more on individual analysis. Second, the learner population in this study is not homogeneous in terms of L2 or L3 age of onset of acquisition (AOA). Third, the L3ers are not beginning learners of Mandarin. These uncontrolled factors likely contributed to the inter-participant variation observed in the data.

7.6 Directions for the future

This research leaves us with several lessons and paves the way for several new directions; a few of each are mentioned here. First, future L3 researchers should be sure to test the L3ers in both their L2 and L3. As this study demonstrated, the learners' L2-Interlanguage may not be target-like. If researchers just assume the L2-Interlanguage to be target-like without testing, it might well obscure the source of transfer. Second, in order to find (a sufficient number of) absolute beginning L3ers, it is advisable for L3 researchers to collaborate with language teachers to design a beginner's course for language learners with the target L1-L2 background, and test them after initial exposure (cf., e.g., Puig-Mayenco & Rothman, 2020). Third, it could be very illuminating to test a group of L1English–L2Korean–L3Mandarin learners, the mirror-image group of the KEM L3ers in this study. Such a mirror-image design can help tease apart the L1SF and the TPM. Fourth, researchers should continue to explore more underinvestigated factors that might play a role in determining the source of transfer, such as L2 proficiency, AOA of the L2

and L3, dominance between the previously-acquired languages, the principal language of communication (e.g., Fallah & Jabbari, 2016), and markedness among the linguistic phenomena (and across the languages) involved,²¹ etc. Doing so could prove essential to having a better understanding of how various factors interact to influence the development of L3s.

²¹ My thanks to William O’Grady for raising a range of issues related to markedness that could be pursued.

Appendix A: English Proficiency Test (J.-H. Park & Choi, 2018)

Word Completion Task

Directions: In the following passages, parts of some words have been deleted. Your task is to complete the words by filling in the missing letters. If you do not know the right answer, then type in your best guess.

Example: The world is full of flowers. They come in different shapes and and colors.

Passage 1

Steven loved almost everything about his grandma. There was only one thing he hated. She always knitted sweaters for (1) h_____. Steven understood that she did it to be (2) n_____. However, all the sweaters were very ugly. Steven (3) v_____ her once a week. She had a new (4) s_____ for him each time. Steven lived in a (5) s_____ apartment. There was no room for him to (6) k_____ all the sweaters. He had to give all of them (7) a_____. “Grandma will never find out,” he thought. One (8) d_____, Steven’s grandma visited him by surprise. She asked to (9) s_____ his sweaters. Someone stole all of them!” he (10) s_____. “They were too nice.” She (11) m_____ him ten more by the next month.

Answer Key: (1) him, (2) nice, (3) visited, (4) sweater, (5) small, (6) keep, (7) away, (8) day, (9) see, (10) said (shouted and screamed are acceptable), (11) made

Passage 2

Depression is a serious but treatable disorder that affects millions of people, from young to old and from rich to poor. It gets in the way of everyday (12) l_____, causing tremendous pain, hurting not just those suffering (13) f_____ it, but also impacting everyone around them.

If (14) s_____ you love is depressed, you may be (15) e_____ any number of difficult emotions, including helplessness, frustration, (16) a_____, fear, guilt, and sadness. These feelings are all (17) n_____. It’s not easy dealing with a friend or (18) f_____ member’s depression. And if you don’t take care of (19) y_____, it can become overwhelming.

That said, there are (20) s_____ you can take to help your loved one. Start by learning about depression and how to talk (21) a_____ it with your friend or family member. But as you reach out, don’t forget to (22) l_____ after your own emotional (23) h_____. Thinking about your own needs is not an (24) a_____ of selfishness—it’s a necessity. Your emotional strength will (25) a_____ you to provide the ongoing support your depressed friend or family member needs.

Answer Key: (12) life, (13) from, (14) someone, (15) experiencing, (16) anger (anxiety is acceptable), (17) normal/natural, (18) family, (19) yourself, (20) steps, (21) about, (22) look, (23) health, (24) act, (25) allow

Passage 3

Nonverbal communication includes facial expressions, gestures, the distance between speakers, eye contact, voice intonations, touch, and many other minor details which can provide speakers with valuable details about each other. For example, (26) s_____ between people can say a lot about the level of intimacy between them: usually, the (27) s_____ the distance between speakers, the more friendly or (28) i_____ they are, and vice versa. Or if a person (29) a_____ eye contact, it might mean that he or she is hiding something, feels (30) u_____ around you, and so on.

Body (31) l_____ has several important functions. For instance, a person's (32) g_____ can repeat the message he or she is (33) m_____ orally; a little child explaining how birds (34) f_____ and waving his or her arms like (35) w_____ is a decent example of this function. Another function, substitution, occurs when (36) v_____ messages can be expressed by nonverbal means (like shrugging). (37) I_____ addition, gestures can be used for accenting, like when (38) r_____ one's index finger when speaking about (39) s_____ important.

At the same time, it is important to remember that sometimes body language may (40) d_____ depending on culture. For example, in some eastern countries, (41) l_____ straight in the eyes of a conversationalist is considered (42) r_____. Men in some Arabic countries may walk around the street (43) h_____ hands, or may kiss each other on the (44) c_____ when greeting, but this is the (45) i_____ of friendship, not romance or intimacy.

Answer Key: (26) space, (27) shorter/smaller, (28) intimate, (29) avoids, (30) uncomfortable/uneasy, (31) language, (32) gestures, (33) making, (34) fly, (35) wings, (36) verbal, (37) in, (38) raising, (39) something, (40) differ, (41) looking, (42) rude, (43) holding, (44) cheek(s), (45) indication

Appendix B: Mandarin Proficiency Test (Wu & Ortega, 2013)

Instructions: Please listen to the audio clips and repeat back the sentence you hear as accurately as possible.

Below are the sentences that participants heard (numbers in the parentheses indicate the number of syllables in the sentence):

1. 我得去剪頭髮了。(7)
I have to get a haircut. (7)
2. 紅色的書在桌子上。(8)
The red book is on the table. (8)
3. 這個城市街道很寬。(8)
The streets in this city are wide. (8)
4. 他每天早上都要洗澡。(9)
He takes a shower every morning. (9)
5. 我聽說明天可能會下雨。(10)
It is possible that it will rain tomorrow. (12)
6. 你剛才說你今天在做什麼？(11)
What did you say you were doing today? (10)
7. 我不覺得他開車開得很好。(11)
I doubt that he knows how to drive that well. (10)
8. 晚飯以後我好好地睡了一覺。(12)
After dinner I had a long, peaceful nap. (11)
9. 我喜歡看有快樂結局的電影。(12)
I enjoy movies that have a happy ending. (12)
10. 這些房子好是好，就是太貴了。(12)
The houses are very nice but too expensive. (12)
11. 昨天死了小貓的小男孩很傷心。(13)
The little boy whose kitten died yesterday is sad. (13)
12. 那家飯館的中國菜應該很不錯。(13)
That restaurant is supposed to have very good food. (13)
13. 你真的很喜歡聽流行音樂，對不對？(14)
You really enjoy listening to country music, don't you? (14)
14. 她剛把公寓所有的房間都漆完了。(14)
She just finished painting the inside of her apartment. (14)
15. 在紅綠燈那過馬路，然後一直往前走。(15)
Cross the street at the light and then just continue straight ahead. (15)
16. 我希望別墅能便宜一些，我才買得起。(15)
I wish the price of town houses would become affordable. (15)
17. 我現在交往的那個人非常有幽默感。(15)
The person I'm dating has a wonderful sense of humor. (15)
18. 我想要一個我的寵物可以住的大房子。(16)
I want a nice, big house in which my animals can live. (14)

- 19 我希望今年的天氣會比去年暖和一點。(16)
I hope it will get warmer sooner this year than it did last year. (16)
- 20 我的一個好朋友老幫他的鄰居看孩子。(16)
A good friend of mine always takes care of my neighbor's three children. (16)
- 21 他得先把房間打掃乾淨才可以出去玩。(16)
Before he can go outside, he has to finish cleaning his room. (16)
- 22 我最快樂的回憶就是那次跟你去看戲。(16)
The most fun I've ever had was when we went to the opera. (16)
- 23 那個被警察抓到的小偷又高又瘦。(16)
The terrible thief whom the police caught was very tall and thin. (17)
- 24 根據統計，每年吸煙的人數越來越多了。(16)
The number of people who smoke cigars is increasing every year. (17/18)
- 25 這次考試根本沒有你跟我說的那麼難。(16)
The exam wasn't nearly as difficult as you told me it would be. (18)
- 26 她點菜的時候只點有肉的，從來不點青菜。(17)
She only orders meat dishes and never eats vegetables. (15/16)
- 27 你昨天喂的那隻黑貓就是被狗追的那隻。(17)
The black cat that you fed yesterday was the one chased by the dog. (16)
- 28 可以麻煩您把桌子上的那本書遞給我嗎？(17)
Would you be so kind as to hand me the book that is on the table? (17)
- 29 我不知道十點半的火車是不是已經開走了。(18)
I don't know if the 11:30 train has left the station yet. (18)
- 30 爲什麼還是有很多人早上什麼東西都不吃呢？(19)
There are a lot of people who don't eat anything at all in the morning. (19)

Appendix C1: English AJT Materials

Instructions:

Speakers of a language have an intuitive sense of which sentences are acceptable or unacceptable in the language, even when they don't know why. For example, most English speakers feel that the first sentence below is acceptable and that the second one is unacceptable. For some acceptable sentences, it might take a little bit of imagination to think of the right context for the sentence to appear, but it is possible. For the unacceptable sentences, you simply cannot think of any context in which the sentence could be used.

1. John is likely to win the race. (Acceptable)
2. John is probable to win the race. (Unacceptable)

In this experiment, you will read sentences in English and rate them using the following scale:

☹️ (Absolutely unacceptable) 😞 (Probably unacceptable) 😊 (Probably acceptable)
😊 (Absolutely acceptable)

When rating the sentences, ask yourself, "Does this sound like something that might have been said on purpose by a native speaker of the language?"

If you cannot provide a rating of the sentence for some reason, such as you don't know the vocabulary in the sentence, you can press "x" on your keyboard to indicate "I don't know."

Here are the ratings we would expect you to give for the sentences we looked at earlier:

1. John is likely to win the race. = 😊 (Absolutely acceptable)
2. John is probable to win the race. = ☹️ (Absolutely unacceptable)

That is all there is to it! You are ready to proceed to the experiment.

Critical items:

Condition 1: Double Object Construction (DOC): NP_{RECIPIENT} + NP_{THEME}

1. Fred sent Joan stamps.
2. Michael sent Lily postcards.
3. David sent John backpacks.
4. William sent me laptops.
5. Sarah passed Lisa cups.
6. Ben sent Emily bikes.
7. Joshua sent Fred checks.
8. Michael passed Kathy bottles.
9. My father offered the baby toys.
10. The vendor sold Susan fans.

11. The principal offered me money.
12. My mom offered my brother cakes.
13. The president offered the athletes cars.
14. The teacher offered David pens.
15. The boss offered the employees coffee makers.
16. The restaurant sold John soup.
17. The bookstore sold Bonnie books.
18. The supermarket sold Kevin oranges.
19. The manager sold David tickets.
20. The department store sold Bob pants.
21. Jessie passed John pencils.
22. John passed Laura rulers.
23. Michael sent Kathy flowers.
24. The secretary passed the boss newspapers.
25. John passed Mary books.

Condition 2: Prepositional Dative Construction (PDC): NP_{THEME} + PP_{RECIPIENT}

1. Fred sent stamps to Joan.
2. Michael sent postcards to Lily.
3. David sent backpacks to John.
4. William sent laptops to me.
5. Sarah passed cups to Lisa.
6. Ben sent bikes to Emily.
7. Joshua sent checks to Fred.
8. Michael passed bottles to Kathy.
9. My father offered toys to the baby.
10. The vendor sold fans to Susan.
11. The principal offered money to me.
12. My mom offered cakes to my brother.
13. The president offered cars to the athletes.
14. The teacher offered pens to David.
15. The boss offered coffee makers to the employees.
16. The restaurant sold soup to John.
17. The bookstore sold books to Bonnie.
18. The supermarket sold oranges to Kevin.
19. The manager sold tickets to David.
20. The department store sold pants to Bob.
21. Jessie passed pencils to John.
22. John passed rulers to Laura.
23. Michael sent flowers to Kathy.
24. The secretary passed newspapers to the boss.
25. John passed books to Mary.

Condition 3: Reverse PDC: PP_{RECIPIENT} + NP_{THEME}

1. * Fred sent to Joan stamps.
2. * Michael sent to Lily postcards.

3. * David sent to John backpacks.
4. * William sent to me laptops.
5. * Sarah passed to Lisa cups.
6. * Ben sent to Emily bikes.
7. * Joshua sent to Fred checks.
8. * Michael passed to Kathy bottles.
9. * My father offered to the baby toys.
10. * The vendor sold to Susan fans.
11. * The principal offered to me money.
12. * My mom offered to my brother cakes.
13. * The president offered to the athletes cars.
14. * The teacher offered to David pens.
15. * The boss offered to the employees coffee makers .
16. * The restaurant sold to John soup.
17. * The bookstore sold to Bonnie books.
18. * The supermarket sold to Kevin oranges.
19. * The manager sold to David tickets.
20. * The department store sold to Bob pants.
21. * Jessie passed to John pencils.
22. * John passed to Laura rulers.
23. * Michael sent to Kathy flowers.
24. * The secretary passed to the boss newspapers.
25. * John passed to Mary books.

Condition 4: Passivization of the Recipient (POR) in the DOC

1. Joan was sent stamps by Fred.
2. Lily was sent postcards by Michael.
3. John was sent backpacks by David.
4. I was sent laptops by William.
5. Lisa was passed cups by Sarah.
6. Emily was sent bikes by Ben.
7. Fred was sent checks by Joshua.
8. Kathy was passed bottles by Michael.
9. The baby was offered toys by my father.
10. Susan was sold fans by the vendor.
11. I was offered money by the principal.
12. My brother was offered cakes by my mom.
13. The athletes were offered cars by the president.
14. David was offered pens by the teacher.
15. The employees were offered coffee makers by the boss.
16. John was sold soup by the restaurant.
17. Bonnie was sold books by the bookstore.
18. Kevin was sold oranges by the supermarket.
19. David was sold tickets by the manager.
20. Bob was sold pants by the department store.
21. John was passed pencils by Jessie.

22. Laura was passed rulers by John.
23. Kathy was sent flowers by Michael.
24. The boss was passed newspapers by the secretary.
25. Mary was passed books by John.

Condition 5: Passivization of the Theme (POT) in the DOC

1. * Stamps were sent Joan by Fred.
2. * Postcards were sent Lily by Michael.
3. * Backpacks were sent John by David.
4. * Laptops were sent me by William.
5. * Cups were passed Lisa by Sarah.
6. * Bikes were sent Emily by Ben.
7. * Checks were sent Fred by Joshua.
8. * Bottles were passed Kathy by Michael.
9. * Toys were offered the baby by my father.
10. * Fans were sold Susan by the vendor.
11. * Money was offered me by the principal.
12. * Cakes were offered my brother by my mom.
13. * Cars were offered the athletes by the president.
14. * Pens were offered David by the teacher.
15. * Coffee makers were offered the employees by the boss.
16. * Soup was sold John by the restaurant.
17. * Books were sold Bonnie by the bookstore.
18. * Oranges were sold Kevin by the supermarket.
19. * Tickets were sold David by the manager.
20. * Pants were sold Bob by the department store.
21. * Pencils were passed John by Jessie.
22. * Rulers were passed Laura by John.
23. * Flowers were sent Kathy by Michael.
24. * Newspapers were passed the boss by the secretary.
25. * Books were passed Mary by John.

Grammatical fillers:

Condition 1: Subject-verb number agreement

1. Every teacher cares for their students.
2. Every author needs to submit their draft on time.
3. Every tourist saw the no smoking sign.
4. Every researcher attended the conference.
5. Every child asked the same old question.

Condition 2: Sentences with a location/direction

6. Sam put a children's book on the table.
7. Mary placed a piece of paper on the floor.
8. John threw a ball at the man.

9. Ben put his pants on the bed.
10. James watched the show in his apartment.

Ungrammatical fillers:

Condition 3: Simple passives²²

1. * Joan was deliberately beaten by John.
2. * Lily was deliberately hit by a car.
3. * Mary was deliberately scolded at by Sam.
4. * Maria was deliberately cheated by Emily.
5. * Rickey was deliberately seen by Josh.

Condition 4: SVAdvO word order

6. * Joan likes China and speaks often Chinese.
7. * Joshua likes very much the life here.
8. * Andy read carefully the book last week.
9. * Mr. Smith at the park often plays basketball.
10. * John in the supermarket bought the watermelon.

Condition 5: SOV word order

11. * Many students can Chinese speak.
12. * Students basketball played yesterday.
13. * Many teachers watermelon love.
14. * My father a letter mailed yesterday.
15. * My mom an article writes every day.

²² Condition 3 of the fillers was intended to be a type of grammatical filler, but experimental error (inclusion of the adverb *deliberately*) forced it to be shifted into the category of ungrammatical filler. See fn. 19.

Appendix C2: Cantonese AJT Materials

Cantonese instructions:

判斷句子

我哋講一種語言，會有本能咁知道邊啲句子可以講，邊啲句子唔可以講，即使我哋未必知道點解。譬如，大部分粵語使用者會覺得下面第一句句子可以講，第二句句子就唔可以講。

1. 有本書嘅張栢度。(可以講)
2. 有一個本書嘅張栢度。(唔可以講)

喺呢個問卷調查裡面，你會讀到一啲粵語句子。請判斷呢啲句子嘅粵語裡面係咪可以講，然後揀選以下一個評分選項：

☹️ (肯定唔可以講) 😐 (可能唔可以講) 😊 (可能可以講) 😄 (肯定可以講)

如果你無法作出判斷，請按"x"鍵。

以下係我哋前面提到嗰兩句句子嘅評分範例：

1. 有本書嘅張栢度。= 😄 (肯定可以講)。
2. 有一個本書嘅張栢度。= ☹️ (肯定唔可以講)

說明到此結束。請按鍵開始實驗。

Critical items:

Condition 1: Double Object Construction (DOC): NP_{RECIPIENT} + NP_{THEME}

1. * 張生送咗小李郵票。
2. * 小紅送咗小梅明信片。
3. * 阿甘送咗阿飛書包。
4. * 阿傑送咗我電腦。
5. * 阿貴遞咗阿潔杯。
6. * 明仔送咗強仔單車。
7. * 小張送咗小明支票。
8. * 發哥遞咗芳芳玻璃樽。
9. * 爹地獎咗 BB 公仔。
10. * 小販賣咗小玉風扇。
11. * 校長獎咗我錢。
12. * 媽咪獎咗細佬蛋糕。
13. * 主席獎咗運動員車。

14. * 老師獎咗阿葉筆。
15. * 老細獎咗職員咖啡機。
16. * 餐廳賣咗阿靜湯。
17. * 書店賣咗華仔書。
18. * 超市賣咗阿珍橙。
19. * 經理賣咗小明票。
20. * 服裝店賣咗阿葉褲。
21. * 小張遞咗小王筆。
22. * 李生遞咗阿敏尺。
23. * 俊俊送咗阿菲花。
24. * 秘書遞咗老細報紙。
25. * 王生遞咗小明書。

Condition 2: Prepositional Dative Construction (PDC): NP_{THEME} + PP_{RECIPIENT}

1. 張生送咗郵票俾小李。
2. 小紅送咗明信片俾小梅。
3. 阿甘送咗書包俾阿飛。
4. 阿傑送咗電腦俾我。
5. 阿貴遞咗杯俾阿潔。
6. 明仔送咗單車俾強仔。
7. 小張送咗支票俾小明。
8. 發哥遞咗玻璃樽俾芳芳。
9. 爹地獎咗公仔俾 BB.
10. 小販賣咗風扇俾小玉。
11. 校長獎咗錢俾我。
12. 媽咪獎咗蛋糕俾細佬。
13. 主席獎咗車俾運動員。
14. 老師獎咗筆俾阿葉。
15. 老細獎咗咖啡機俾職員。
16. 餐廳賣咗湯俾阿靜。
17. 書店賣咗書俾華仔。
18. 超市賣咗橙俾阿珍。
19. 經理賣咗票俾小明。
20. 服裝店賣咗褲俾阿葉。
21. 小張遞咗筆俾小王。
22. 李生遞咗尺俾阿敏。
23. 俊俊送咗花俾阿菲。
24. 秘書遞咗報紙俾老細。
25. 王生遞咗書俾小明。

Condition 3: Reverse PDC: PP_{RECIPIENT} + NP_{THEME}

1. * 張生送咗俾小李郵票。
2. * 小紅送咗俾小梅明信片。
3. * 阿甘送咗俾阿飛書包。
4. * 阿傑送咗俾我電腦。
5. * 阿貴遞咗俾阿潔杯。
6. * 明仔送咗俾強仔單車。
7. * 小張送咗俾小明支票。
8. * 發哥遞咗俾芳芳玻璃樽。
9. * 爹地獎咗俾 BB 公仔。
10. * 小販賣咗俾小玉風扇。
11. * 校長獎咗俾我錢。
12. * 媽咪獎咗俾細佬蛋糕。
13. * 主席獎咗俾運動員車。
14. * 老師獎咗俾阿葉筆。
15. * 老細獎咗俾職員咖啡機。
16. * 餐廳賣咗俾阿靜湯。
17. * 書店賣咗俾華仔書。
18. * 超市賣咗俾阿珍橙。
19. * 經理賣咗俾小明票。
20. * 服裝店賣咗俾阿葉褲。
21. * 小張遞咗俾小王筆。
22. * 李生遞咗俾阿敏尺。
23. * 俊俊送咗俾阿菲花。
24. * 秘書遞咗俾老細報紙。
25. * 王生遞咗俾小明書。

Condition 4: Passivization of the Recipient (POR) in the DOC

1. * 小李畀張生送咗郵票。
2. * 小梅畀小紅送咗明信片。
3. * 阿飛畀阿甘送咗書包。
4. * 我畀阿傑送咗電腦。
5. * 阿潔畀阿貴遞咗杯。
6. * 強仔被明仔送咗單車。
7. * 小明畀小張送咗支票。
8. * 芳芳畀發哥遞咗玻璃樽。
9. * BB 畀爹地獎咗公仔。
10. * 小玉畀小販賣咗風扇。
11. * 我畀校長獎咗錢。
12. * 細佬畀媽咪獎咗蛋糕。

13. * 運動員畀主席獎咗車。
14. * 阿葉畀老師獎咗筆。
15. * 職員畀老細獎咗咖啡機。
16. * 阿靜畀餐廳賣咗湯。
17. * 華仔畀書店賣咗書。
18. * 阿珍畀超市賣咗橙。
19. * 小明畀經理賣咗票。
20. * 阿葉畀服裝店賣咗褲。
21. * 小王畀小張遞咗筆。
22. * 阿敏畀李生遞咗尺。
23. * 阿菲畀俊俊送咗花。
24. * 老細畀秘書遞咗報紙。
25. * 小明畀王生遞咗書。

Condition 5: Passivization of the Theme (POT) in the DOC

1. * 郵票畀張生送咗小李。
2. * 明信片畀小紅送咗小梅。
3. * 書包畀阿甘送咗阿飛。
4. * 電腦畀阿傑送咗我。
5. * 杯畀阿貴遞咗阿潔。
6. * 單車畀明仔送咗強仔。
7. * 支票畀小張送咗小明。
8. * 玻璃樽畀發哥遞咗芳芳。
9. * 公仔畀爹地獎咗 BB。
10. * 風扇畀小販賣咗小玉。
11. * 錢畀校長獎咗我。
12. * 蛋糕畀媽咪獎咗細佬。
13. * 車畀主席獎咗運動員。
14. * 筆畀老師獎咗阿葉。
15. * 咖啡機畀老細獎咗職員。
16. * 湯畀餐廳賣咗阿靜。
17. * 書畀書店賣咗華仔。
18. * 橙畀超市賣咗阿珍。
19. * 票畀經理賣咗小明。
20. * 褲畀服裝店賣咗阿葉。
21. * 筆畀小張遞咗小王。
22. * 尺畀李生遞咗阿敏。
23. * 花畀俊俊送咗阿菲。
24. * 報紙畀秘書遞咗老細。
25. * 書畀王生遞咗小明。

Grammatical fillers:

Condition 1: Simple passives

1. 小张專登俾小王打。
2. 小明專登俾車撞。
3. 小红專登俾老王鬧。
4. 小李專登俾小白呢。
5. 發哥專登畀阿甘睇見。

Condition 2: zoeng sentences

6. 李生將個銀包搵咗返黎。
7. 阿王將一個字寫錯咗。
8. 王生將錢畀咗張生。
9. 李生將條褲洗咗。
10. 小白將咖啡飲咗。

Condition 3: Sentences with an adverb

11. 佢鐘意中國，成日講中文。
12. 佢地非常中意呢度嘅生活。
13. 佢喺圖書館睇緊書。
14. 趙老師成日喺公園打籃球。
15. 王生成日喺士多店買生果。

Condition 4: Simple SVO sentences

16. 好多學生都識講中文。
17. 啲同學仔喺度打籃球。
18. 好多老師都鍾意西瓜。
19. 爹地琴日寄咗一封信。
20. 媽咪琴日寫咗一篇文。

Ungrammatical fillers:

Condition 5: Ungrammatical use of negative verb

1. * 英文可能有係咁易學噃。
2. * 呢個有係我嘅銀包。
3. * 張生唔買到書。
4. * 佢唔吃過日本拉麵。
5. * 我一句義大利文都有識講。

Appendix C3: Korean AJT Materials

Instructions:

Speakers of a language have an intuitive sense of which sentences are acceptable or unacceptable in the language, even when they don't know why. For example, most English speakers feel that the first sentence below is acceptable and that the second one is unacceptable. For some acceptable sentences, it might take a little bit of imagination to think of the right context for the sentence to appear, but it is possible. For the unacceptable sentences, you simply cannot think of any context in which the sentence could be used.

1. John is likely to win the race. (Acceptable)
2. John is probable to win the race. (Unacceptable)

In this second task, you will read sentences in English and rate them using the following scale:

☹️ (Absolutely unacceptable) 😞 (Probably unacceptable) 😊 (Probably acceptable)
😊 (Absolutely acceptable)

When rating the sentences, ask yourself, "Does this sound like something that might have been said on purpose by a native speaker of the language?"

If you cannot provide a rating of the sentence for some reason, such as you don't know the vocabulary in the sentence, you can press "x" on your keyboard to indicate "I don't know."

Here are the ratings we would expect you to give for the sentences we looked at earlier:

1. John is likely to win the race. = 😊 (Absolutely acceptable)
2. John is probable to win the race. = ☹️ (Absolutely unacceptable)

That's all there is to it! You're ready to proceed to the English rating task.

Critical items:

Condition 1: Double Object Construction (DOC): NP_{RECIPIENT} + NP_{THEME}

1. * 프레드가 존을 선물을 보냈다.
2. * 마이클이 릴리를 엽서를 보냈다.
3. * 내가 존을 가방을 보냈다.
4. * 윌리엄이 나를 노트북을 보냈다.
5. * 사라가 리사를 컵을 보냈다.
6. * 벤이 에밀리를 자전거를 보냈다.
7. * 조슈아가 프레드를 300 불을 보냈다.
8. * 마이클이 메리를 물병을 건넸다.
9. * 우리 아빠가 아기를 장남감을 주었다.

10. * 판매자가 수잔을 선풍기를 팔았다.
11. * 교장 선생님이 나를 상장을 수여하셨다.
12. * 경찰서장이 경찰관을 배지를 수여하셨다.
13. * 대통령이 총리를 임명장을 수여했다.
14. * 선생님이 데이비드를 상패를 수여했다.
15. * 상사가 직원을 부상을 수여했다.
16. * 주인이 존을 국 한 그릇을 팔았다.
17. * 직원이 바니를 책을 팔았다.
18. * 점원이 케빈을 오렌지를 팔았다.
19. * 주인이 앤디를 집을 팔았다.
20. * 판매원이 에릭을 바지를 팔았다.
21. * 제시가 존을 연필을 건넸다.
22. * 존이 로라를 자를 건넸다.
23. * 마이클이 에이미를 꽃을 건넸다.
24. * 비서가 상사를 신문을 건넸다.
25. * 존이 메리를 책을 건넸다.

Condition 2: Prepositional Dative Construction (PDC): NP_{THEME} + PP_{RECIPIENT}

1. 프레드가 선물을 존에게 보냈다.
2. 마이클이 엽서를 릴리에게 보냈다.
3. 내가 가방을 존에게 보냈다.
4. 윌리엄이 노트북을 나에게 보냈다.
5. 사라가 컵을 리사에게 보냈다.
6. 벤이 자전거를 에밀리에게 보냈다.
7. 조슈아가 300 불을 프레드에게 보냈다.
8. 마이클이 물병을 메리에게 건넸다.
9. 우리 아빠가 장난감을 아기에게 주었다.
10. 판매자가 선풍기를 수잔에게 팔았다.
11. 교장 선생님이 상장을 나에게 수여하셨다.
12. 경찰서장이 배지를 경찰관에게 수여하셨다.
13. 대통령이 임명장을 총리에게 수여했다.
14. 선생님이 상패를 데이비드에게 수여했다.
15. 상사가 부상을 직원에게 수여했다.
16. 주인이 국 한 그릇을 존에게 팔았다.
17. 직원이 책을 바니에게 팔았다.
18. 점원이 오렌지를 케빈에게 팔았다.
19. 주인이 집을 앤디에게 팔았다.
20. 판매원이 바지를 에릭에게 팔았다.
21. 제시가 연필을 존에게 건넸다.
22. 존이 자를 로라에게 건넸다.
23. 마이클이 꽃을 에이미에게 건넸다.

24. 비서가 신문을 상사에게 건넸다.
25. 존이 책을 메리에게 건넸다.

Condition 3: Reverse PDC: PP_{RECIPIENT} + NP_{THEME}

1. 프레드가 존에게 선물을 보냈다.
2. 마이클이 릴리에게 엽서를 보냈다.
3. 내가 존에게 가방을 보냈다.
4. 윌리엄이 나에게 노트북을 보냈다.
5. 사라가 리사에게 컵을 보냈다.
6. 벤이 에밀리에게 자전거를 보냈다.
7. 조슈아가 프레드에게 300 불을 보냈다.
8. 마이클이 메리에게 물병을 건넸다.
9. 우리 아빠가 아기에게 장난감을 주었다.
10. 판매자가 수잔에게 선풍기를 팔았다.
11. 교장 선생님이 나에게 상장을 수여하셨다.
12. 경찰서장이 경찰관에게 배지를 수여하셨다.
13. 대통령이 총리에게 임명장을 수여했다.
14. 선생님이 데이비드에게 상패를 수여했다.
15. 상사가 직원에게 부상을 수여했다.
16. 주인이 존에게 국 한 그릇을 팔았다.
17. 직원이 바니에게 책을 팔았다.
18. 점원이 케빈에게 오렌지를 팔았다.
19. 주인이 앤디에게 집을 팔았다.
20. 판매원이 에릭에게 바지를 팔았다.
21. 제시가 존에게 연필을 건넸다.
22. 존이 로라에게 자를 건넸다.
23. 마이클이 에이미에게 꽃을 건넸다.
24. 비서가 상사에게 신문을 건넸다.
25. 존이 메리에게 책을 건넸다.

Condition 4: Passivization of the Recipient (POR) in the DOC

1. * 존이 프레드에 의해 선물을 보내졌다.
2. * 릴리가 마이클에 의해 엽서를 보내졌다.
3. * 존이 나에 의해 가방을 보내졌다.
4. * 내가 윌리엄에 의해 노트북을 보내졌다.
5. * 리사가 사라에 의해 컵을 보내졌다.
6. * 에밀리가 벤에 의해 자전거를 보내졌다.
7. * 프레드가 조슈아에 의해 300 불을 보내졌다.
8. * 메리가 마이클에 의해 물병을 건네졌다.
9. * 아기가 우리 아빠에 의해 장난감을 주어졌다.
10. * 수잔이 판매자에 의해 선풍기를 팔렸다.

11. * 내가 교장 선생님의 의해 상장을 수여되었다.
12. * 경찰관이 경찰서장에 의해 배지를 수여되었다.
13. * 총리가 대통령에 의해 임명장을 수여되었다.
14. * 데이비드가 선생님의 의해 상패를 수여되었다.
15. * 직원이 상사에 의해 부상을 수여되었다.
16. * 존이 주인에 의해 국 한 그릇을 팔렸다.
17. * 바니가 직원에 의해 책을 팔렸다.
18. * 케빈이 점원에 의해 오렌지를 팔렸다.
19. * 앤디가 주인에 의해 집을 팔렸다.
20. * 에릭이 판매원에 의해 바지를 팔렸다.
21. * 존이 제시에 의해 연필을 건네졌다.
22. * 로라가 존에 의해 자를 건네졌다.
23. * 에이미가 마이클에 의해 꽃을 건네졌다.
24. * 상사가 비서에 의해 신문을 건네졌다.
25. * 메리가 존에 의해 책을 건네졌다.

Condition 5: Passivization of the Theme (POT) in the DOC

1. * 선물이 프레드에 의해 존을 보내졌다.
2. * 엽서가 마이클에 의해 릴리를 보내졌다.
3. * 가방이 나에 의해 존을 보내졌다.
4. * 노트북이 윌리엄에 의해 나를 보내졌다.
5. * 컵이 사라에 의해 리사를 보내졌다.
6. * 자전거가 벤에 의해 에밀리를 보내졌다.
7. * 300 불이 조슈아에 의해 프레드를 보내졌다.
8. * 물병이 마이클에 의해 메리를 건네졌다.
9. * 장난감이 우리 아빠에 의해 아기를 주어졌다.
10. * 선풍기가 판매자에 의해 수잔을 팔렸다.
11. * 상장이 교장 선생님의 의해 나를 수여되었다.
12. * 배지가 경찰서장에 의해 경찰관을 수여되었다.
13. * 임명장이 대통령에 의해 총리를 수여되었다.
14. * 상패가 선생님의 의해 데이비드를 수여되었다.
15. * 부상이 상사에 의해 직원을 수여되었다.
16. * 국 한그릇이 주인에 의해 존을 팔렸다.
17. * 책이 직원에 의해 바니를 팔렸다.
18. * 오렌지가 점원에 의해 케빈을 팔렸다.
19. * 집이 주인에 의해 앤디를 팔렸다.
20. * 바지가 판매원에 의해 에릭을 팔렸다.
21. * 연필이 제시에 의해 존을 건네졌다.
22. * 자가 존에 의해 로라를 건네졌다.
23. * 꽃이 마이클에 의해 에이미를 건네졌다.

24. * 신문이 비서에 의해 상사를 건네졌다.
25. * 책이 존에 의해 메리를 건네졌다.

Grammatical fillers:

Condition 1: Locative sentences

1. 현우가 나와 같이 어제 오전에 책방에 갔어요.
2. 민기가 나와 같이 어제 오전에 식당에 갔어요.
3. 태우가 나와 같이 어제 오전에 공원에 갔어요.
4. 영미가 엄마와 같이 어제 오후에 병원에 갔어요.
5. 진희가 엄마와 같이 어제 오후에 교실에 갔어요.

Condition 2: Negation sentences with Negative Polarity Items

6. 아무 학생도 교실에 없어요.
7. 아무 학생도 화장실에 없어요.
8. 아무 학생도 도서관에 없어요.
9. 아무 차도 거리에 없어요.
10. 아무 차도 길에 없어요.

Condition 3: Resultative sentences

11. 민희가 녹색으로 교실을 칠했어요.
12. 진수가 식탁에 종이를 덮었어요.
13. 미라가 물병에 주스를 채웠어요.
14. 미라가 거실에 흰색을 칠했어요.
15. 진수가 이불로 침대를 덮었어요.

Ungrammatical fillers:

Condition 4: Sentences with unlicensed Negative Polarity Items

1. * 아무 사람도 공원에 있어요.
2. * 아무 사람도 시장에 있어요.
3. * 아무 사람도 백화점에 있어요.
4. * 아무 사람도 엘리베이터에 있어요.
5. * 아무 학생도 학교에 있어요.

Condition 5: Misuse of accusative markers in locative sentences

6. * 철수가 나를 어제 오전에 학교에 갔어요.
7. * 영수가 나를 어제 오전에 마켓에 갔어요.
8. * 민수가 나를 어제 오전에 시장에 갔어요.
9. * 진수가 나를 어제 오전에 은행에 갔어요.
10. * 영재가 나를 어제 오전에 교회에 갔어요.

Appendix C4: Mandarin AJT Materials

Mandarin instructions:

我们说一种语言，会本能地知道哪些句子可以说，哪些句子不可说，即使我们可能并不知道为什么。比如说，大部分普通话使用者会觉得下面第一个句子可以说，第二个句子不可说。

1. 有本书在桌子上。(可以说)
2. 有那本书在桌子上。(不可说)

在这个问卷调查中，你将会读到一些普通话的句子。请判断这些句子在普通话中是否可以说，并勾选以下一个评分选项。

☹️ (肯定不可说) 😐 (可能不可说) 😊 (可能可以说) 😄 (肯定可以说)

如果你无法做出判断，请按"x"键。

以下是我们前面提到的两个句子的评分范例：

1. 有本书在桌子上。= 😄 (肯定可以说)
2. 有那本书在桌子上。= ☹️ (肯定不可说)

说明到此结束。请按键开始实验。

Critical items:

Condition 1: Double Object Construction (DOC): NP_{RECIPIENT} + NP_{THEME}

1. 老张送给了小李邮票。
2. 小红送给了小梅明信片。
3. 小张送给了小孙书包。
4. 老赵送给了我电脑。
5. 小林递给了小赵杯子。
6. 老王送给了小赵自行车。
7. 小张送给了小明支票。
8. 卓宁递给了芳芳玻璃杯。
9. 爸爸奖给了宝宝玩具。
10. 小贩卖给了小玉风扇。
11. 校长奖给了我钱。
12. 妈妈奖给了弟弟蛋糕。
13. 主席奖给了运动员汽车。
14. 老师奖给了小王笔。

15. 老板奖给了员工咖啡机。
16. 餐厅卖给了小白汤。
17. 书店卖给了小梅书。
18. 超市卖给了小李橙子。
19. 经理卖给了小明票。
20. 服装店卖给了小李裤子。
21. 小张递给了小王笔。
22. 老李递给了小娟尺子。
23. 小陈送给了小娟花。
24. 秘书递给了老板报纸。
25. 老王递给了小明书。

Condition 2: Prepositional Dative Construction (PDC): NP_{THEME} + PP_{RECIPIENT}

1. 老张送了邮票给小李。
2. 小红送了明信片给小梅。
3. 小张送了书包给小孙。
4. 老赵送了电脑给我。
5. 小林递了杯子给小赵。
6. 老王送了自行车给小赵。
7. 小张送了支票给小明。
8. 卓宁递了玻璃杯给芳芳。
9. 爸爸奖了玩具给宝宝。
10. 小贩卖了风扇给小玉。
11. 校长奖了钱给我。
12. 妈妈奖了蛋糕给弟弟。
13. 主席奖了汽车给运动员。
14. 老师奖了笔给小王。
15. 老板奖了咖啡机给员工。
16. 餐厅卖了汤给小白。
17. 书店卖了书给小梅。
18. 超市卖了橙子给小李。
19. 经理卖了票给小明。
20. 服装店卖了裤子给小李。
21. 小张递了笔给小王。
22. 老李递了尺子给小娟。
23. 小陈送了花给小娟。
24. 秘书递了报纸给老板。
25. 老王递了书给小明。

Condition 3: Reverse PDC: PP_{RECIPIENT} + NP_{THEME}

1. * 老张送了给小李邮票。
2. * 小红送了给小梅明信片。
3. * 小张送了给小孙书包。
4. * 老赵送了给我电脑。
5. * 小林递了给小赵杯子。
6. * 老王送了给小赵自行车。
7. * 小张送了给小明支票。
8. * 卓宁递了给芳芳玻璃杯。
9. * 爸爸奖了给宝宝玩具。
10. * 小贩卖了给小玉风扇。
11. * 校长奖了给我钱。
12. * 妈妈奖了给弟弟蛋糕。
13. * 主席奖了给运动员汽车。
14. * 老师奖了给小王笔。
15. * 老板奖了给员工咖啡机。
16. * 餐厅卖了给小白汤。
17. * 书店卖了给小梅书。
18. * 超市卖了给小李橙子。
19. * 经理卖了给小明票。
20. * 服装店卖了给小李裤子。
21. * 小张递了给小王笔。
22. * 老李递了给小娟尺子。
23. * 小陈送了给小娟花。
24. * 秘书递了给老板报纸。
25. * 老王递了给小明书。

Condition 4: Passivization of the Recipient (POR) in the DOC

1. * 小李被老张送给了邮票。
2. * 小梅被小红送给了明信片。
3. * 小孙被小张送给了书包。
4. * 我被老赵送给了电脑。
5. * 小赵被小林递给了杯子。
6. * 小赵被老王送给了自行车。
7. * 小明被小张送给了支票。
8. * 芳芳被卓宁递给了玻璃杯。
9. * 宝宝被爸爸奖给了玩具。
10. * 小玉被小贩卖给了风扇。
11. * 我被校长奖给了钱。
12. * 弟弟被妈妈奖给了蛋糕。

13. * 运动员被主席奖给了汽车。
14. * 小王被老师奖给了笔。
15. * 员工被老板奖给了咖啡机。
16. * 小白被餐厅卖给了汤。
17. * 小梅被书店卖给了书。
18. * 小李被超市卖给了橙子。
19. * 小明被经理卖给了票。
20. * 小李被服装店卖给了裤子。
21. * 小王被小张递给了笔。
22. * 小娟被老李递给了尺子。
23. * 小娟被小陈送给了花。
24. * 老板被秘书递给了报纸。
25. * 小明被老王递给了书。

Condition 5: Passivization of the Theme (POT) in the DOC

1. 邮票被小李送给了老张。
2. 明信片被小红送给了小梅。
3. 书包被小张送给了小孙。
4. 电脑被老赵送给了我。
5. 杯子被小林递给了小赵。
6. 自行车被老王送给了小赵。
7. 支票被小张送给了小明。
8. 玻璃杯被卓宁递给了芳芳。
9. 玩具被爸爸奖给了宝宝。
10. 风扇被小贩卖给了小玉。
11. 钱被校长奖给了我。
12. 蛋糕被妈妈奖给了弟弟。
13. 汽车被主席奖给了运动员。
14. 笔被老师奖给了小王。
15. 咖啡机被老板奖给了员工。
16. 汤被餐厅卖给了小白。
17. 书被书店卖给了小梅。
18. 橙子被超市卖给了小李。
19. 票被经理卖给了小明。
20. 裤子被服装店卖给了小李。
21. 笔被小张递给了小王。
22. 尺子被老李递给了小娟。
23. 花被小陈送给了小娟。
24. 报纸被秘书递给了老板。
25. 书被老王递给了小明。

Grammatical fillers:

Condition 1: Simple passives

1. 小张故意被小王打了。
2. 小明故意被车子撞了。
3. 小红故意被老王骂了。
4. 小李故意被小白騙了。
5. 王朋故意被小趙看見了。

Condition 2: ba sentences

6. 小李把錢包找到了。
7. 王朋把一個字寫錯了。
8. 老王把錢給小張了。
9. 李友把褲子洗乾淨了。
10. 小白把咖啡喝掉了。

Ungrammatical fillers:

Condition 3: Simple negative sentences

1. * 英語可能沒是很容易學的。
2. * 小趙不有東西吃了。
3. * 他們很沒高興地走了。
4. * 小張不有買到書。
5. * 小李昨天不有來。

Condition 4: Impossible adverb placement

6. * 他喜歡中國，講經常漢語。
7. * 他們喜歡非常這的生活。
8. * 他正在看書在圖書館。
9. * 趙老師常常打籃球在公園。
10. * 老王經常買水果在水果店。

Condition 5: SOV word order

11. * 很多學生都漢語會講。
12. * 同學們都在籃球打。
13. * 很多老師都西瓜喜歡。
14. * 我爸爸昨天一封信寄了。
15. * 媽媽昨天一篇文章寫了。

Appendix D: Mean Z-score Ratings (SD) of the Fillers in the AJTs

Group	<i>n</i>	Version	Grammatical fillers	Ungrammatical fillers
Cantonese Natives	22	Cantonese	0.86 (0.45)	-0.68 (0.73)
English Natives	16	English	0.68 (0.72)	-0.56 (0.83)
Korean Natives	14	Korean	0.86 (0.47)	-1.00 (0.12)
Mandarin Natives	22	Mandarin	0.82 (0.76)	-0.71 (0.66)
CEM	32	English	0.88 (0.52)	-0.45 (0.92)
CEM	32	Mandarin	1.01 (0.66)	-0.71 (0.67)
KEM	34	English	0.95 (0.62)	-0.31 (0.97)
KEM	34	Mandarin	0.55 (0.79)	-0.40 (0.93)

References

- Arıbaş, D. Ş., & Cele, F. (2021). Acquisition of articles in L2 and L3 English: The influence of L2 proficiency on positive transfer from L2 to L3. *Journal of Multilingual and Multicultural Development*, 42(1), 19–36.
<https://doi.org/10.1080/01434632.2019.1667364>
- Bardel, C., & Falk, Y. (2007). The role of the second language in third language acquisition: The case of Germanic syntax. *Second Language Research*, 23(4), 459–484.
<https://doi.org/10.1177/0267658307080557>
- Bardel, C., & Sanchez, L. (2017). The L2 status factor hypothesis revisited: The role of metalinguistic knowledge, working memory, attention and noticing in third language learning. In T. Angelovska & A. Hahn (Eds.), *L3 syntactic transfer: Models, new developments and implications* (pp. 85–101). John Benjamins.
<https://doi.org/10.1075/bpa.5.05bar>
- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1). <https://doi.org/10.18637/jss.v067.i01>
- Bley-Vroman, R. (1983). The comparative fallacy in Interlanguage studies: The case of systematicity. *Language Learning*, 33(1), 1–17. <https://doi.org/10.1111/j.1467-1770.1983.tb00983.x>
- Bley-Vroman, R., & Chaudron, C. (1994). Elicited imitation as a measure of second-language competence. In E. Tarone, S. M. Gass, & A. D. Cohen (Eds.), *Research methodology in second-language acquisition* (pp. 245–261). L. Erlbaum.
- Bley-Vroman, R., & Yoshinaga, N. (1992). Broad and narrow constraints on the English dative alternation: Some fundamental differences between native speakers and foreign language learners. *University of Hawaii Working Papers in ESL*, 11, 157–199.
- Bruening, B. (2010). Ditransitive asymmetries and a theory of idiom formation. *Linguistic Inquiry*, 41(4), 519–562. https://doi.org/10.1162/LING_a_00012
- Cabrelli, J., & Puig-Mayenco, E. (2021). Theoretical and methodological considerations for a robust evaluation of the Linguistic Proximity Model. *Second Language Research*, 37(3), 465–471. <https://doi.org/10.1177/0267658320943661>

- Chang, H. (2014). The acquisition of Chinese double object constructions and dative alternation constructions by English and French native speakers. *Applied Linguistics*, 2(2), 96–106. <https://doi.org/10.16499/j.cnki.1003-5397.2014.02.013>
- Chin, A. C. (2011). Grammaticalization of the Cantonese double object verb [pei35] 罨 in typological and areal perspectives. *Language and Linguistics*, 12(3), 529–563.
- Chin, C. O. (2009). *The verb GIVE and the double-object construction in Cantonese in synchronic, diachronic and typological perspectives* [Doctoral dissertation, University of Washington]. ProQuest Dissertations & Theses Global.
- Cho, J.-H. (1994). *Scrambling in Korean: Crossover, reconstruction and binding theory* [Doctoral dissertation, University of Connecticut]. ProQuest Dissertations & Theses Global.
- Choi, H.-W. (2007). Length and order: A corpus study of Korean Dative-Accusative construction. *Discourse and Cognition*, 14(3), 207–227. <https://doi.org/10.15718/discog.2007.14.3.207>
- Choi, H.-W. (2009). Ordering a left-branching language: Heaviness vs. Givenness. *Language and Information*, 13, 39–56.
- Chomsky, N. (1981). *Lectures on government and binding*. Foris.
- Council of Europe. (2001). *Common European framework of reference for languages: Learning, teaching and assessment*. Council of Europe. <https://books.google.com/books?id=5u5UDwAAQBAJ>
- Drummond, A. (n.d.). *Ibex 0.3.8 manual*. http://spellout.net/latest_ibex_manual.pdf
- Dryer, M. S. (1986). Primary objects, secondary objects, and antidative. *Language*, 62(4), 808–845. <https://doi.org/10.2307/415173>
- Falk, Y., & Bardel, C. (2011). Object pronouns in German L3 syntax: Evidence for the L2 status factor. *Second Language Research*, 27(1), 59–82. <https://doi.org/10.1177/0267658310386647>
- Falk, Y., & Bardel, C. (2021). Transfer patterns in L3 learning discussed. *Linguistic Approaches to Bilingualism*, 11(1), 50–53. <https://doi.org/10.1075/lab.20082.fal>
- Fallah, N., & Jabbari, A. A. (2018). L3 acquisition of English attributive adjectives: Dominant language of communication matters for syntactic cross-linguistic influence. *Linguistic Approaches to Bilingualism*, 8(2), 193–216. <https://doi.org/10.1075/lab.16003.fal>

- Fallah, N., Jabbari, A. A., & Fazilatfar, A. M. (2016). Source(s) of syntactic cross-linguistic influence (CLI): The case of L3 acquisition of English possessives by Mazandarani–Persian bilinguals. *Second Language Research*, 32(2), 225–245.
<https://doi.org/10.1177/0267658315618009>
- Fang, B., & Wu, Y. (2016). Gaodeng jiaoyu laihua liuxuesheng de bianhua qushi yanjiu: Jiyu jin shiwunian tongji shuju [On changing trends of China’s foreign students of higher education]. *Gaodeng Jiaoyu Yanjiu [Journal of Higher Education]*, 39(2), 19–30.
- Feng, S. (1997). Guanyuelun lilun yu Hanyu de beidong ju [GB theory and passive sentences in Chinese]. In C.-T. J. Huang (Ed.), *Zhongguo yuyanxue luncong [Studies in Chinese linguistics]* (pp. 1–28).
- Giancaspro, D., Halloran, B., & Iverson, M. (2015). Transfer at the initial stages of L3 Brazilian Portuguese: A look at three groups of English/Spanish bilinguals. *Bilingualism: Language and Cognition*, 18(2), 191–207. <https://doi.org/10.1017/S1366728914000339>
- Green, G. M. (1974). *Semantics and syntactic regularity*. Indiana University Press.
- Gries, S. Th., & Deshors, S. C. (2015). EFL and/vs. ESL?: A multi-level regression modeling perspective on bridging the paradigm gap. *International Journal of Learner Corpus Research*, 1(1), 130–159. <https://doi.org/10.1075/ijlcr.1.1.05gri>
- Gropen, J., Pinker, S., Hollander, M., Goldberg, R., & Wilson, R. (1989). The learnability and acquisition of the dative alternation in English. *Language*, 65(2), 203–257.
<https://doi.org/10.2307/415332>
- Harley, H. (2002). Possession and the double object construction. *Linguistic Variation Yearbook*, 2, 31–70. <https://doi.org/10.1075/livy.2.04har>
- Hashimoto, M. J. (1978). Observations on the passive construction. In M. A. Jazayery, E. C. Polomé, & W. Winter (Eds.), *Linguistic and literary studies: Descriptive linguistics* (Vol. 2, pp. 53–66). De Gruyter. <https://doi.org/10.1515/9783110800432.53>
- Hashimoto, M. J. (1987). Hanyu beidongshi de lishi quyü fazhan [The historical and geographical development of Chinese passive constructions]. *Zhongguo Yuwen [Chinese Language]*, 196, 36–49.
- Haspelmath, M. (2005). Argument marking in ditransitive alignment types. *Linguistic Discovery*, 3, 1–21.

- Haspelmath, M. (2015). Ditransitive constructions. *Annual Review of Linguistics*, 11(1), 19–41.
<https://doi.org/10.1146/annurev-linguist-030514-125204>
- Henning, G. (1983). Oral proficiency testing: Comparative validities of interview, imitation, and completion methods. *Language Learning*, 33(3), 315–332.
<https://doi.org/10.1111/j.1467-1770.1983.tb00544.x>
- Her, O. S. (2006). Justifying part-of-speech assignments for Mandarin *gei*. *Lingua*, 116(8), 1274–1302.
- Hermas, A. (2010). Language acquisition as computational resetting: Verb movement in L3 initial state. *International Journal of Multilingualism*, 7(4), 343–362.
- Hermas, A. (2014). Restrictive relatives in L3 English: L1 transfer and ultimate attainment convergence. *Australian Journal of Linguistics*, 34(3), 361–387.
<https://doi.org/10.1080/07268602.2014.898227>
- Hong, K.-S. (1992). *Argument selection and case marking in Korean* [Doctoral dissertation, Stanford University]. ProQuest Dissertations & Theses Global.
- Hsin, A. (2002). On indefinite subject NPs in Chinese. *Hanxue Yanjiu [Chinese Studies]*, 20, 353–376.
- Huang, C.-R. (1993). Mandarin Chinese and the lexical mapping theory: A study of the interaction of morphology and argument changing. *The Bulletin of the Institute of History and Philology Academia Sinica*, 62, 1–44.
- Huang, C.-R., & Ahrens, K. (1999). The function and category of *gei* in Mandarin ditransitive constructions. *Journal of Chinese Linguistics*, 27, 1–26.
- Huang, C.-R., & Mangione, L. (1985). A reanalysis of *de*: Adjuncts and subordinate clauses. In J. Goldberg, S. Mackaye, & M. Wescoat (Eds.), *Proceedings of West Coast Conference on Formal Linguistics IV* (pp. 80–91). Stanford Linguistics Association.
- Huang, C.-T. J. (1982). *Logical relations in Chinese and the theory of grammar* [Doctoral dissertation, Massachusetts Institute of Technology]. ProQuest Dissertations & Theses Global.
- Huang, C.-T. J. (1984). On the distribution and reference of empty pronouns. *Linguistic Inquiry*, 15(4), 531–574.
- Huang, C.-T. J., Li, Y. A., & Li, Y. (2009). *The syntax of Chinese*. Cambridge University Press.

- Jung, Y.-J., & Miyagawa, S. (2004). Decomposing ditransitive verbs. In R.-H.-Y. Kim (Ed.), *Proceedings of the 6th Seoul International Conference of Generative Grammar* (pp. 101–120). Korean Generative Grammar Circle.
- Kim, L. (2008). On the ditransitive construction in Korean. In S. Blaho, C. Constantinescu, & E. Schoorlemmer (Eds.), *Proceedings of the 15th Annual Conference of the Student Organization of Linguistics in Europe* (pp. 111–133). Student Organization for Linguistics in Europe.
- Kim, L. (2015). Asymmetric ditransitive constructions: Evidence from Korean. *Lingua*, *165*, 28–69. <https://doi.org/10.1016/j.lingua.2015.06.003>
- Kostromitina, M., & Plonsky, L. (2022). Elicited imitation tasks as a measure of L2 proficiency: A meta-analysis. *Studies in Second Language Acquisition*, *44*(3), 886–911. <https://doi.org/10.1017/S0272263121000395>
- Kuo, P.-J. (2016). Applicative and the double object construction in Mandarin Chinese. *Taiwan Journal of Linguistics*, *14*(2), 33–76. [https://doi.org/10.6519/TJL.2016.14\(2\).2](https://doi.org/10.6519/TJL.2016.14(2).2)
- Kush, D., & Dahl, A. (2020). L2 transfer of L1 island-insensitivity: The case of Norwegian. *Second Language Research*, *38*(2), 315–346. <https://doi.org/10.1177/0267658320956704>
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software*, *82*(13), 1–16. <https://doi.org/10.18637/jss.v082.i13>
- Larson, R. K. (1988). On the double object construction. *Linguistic Inquiry*, *19*(3), 335–391.
- Lee, D. (2004). Scope-Freezing effect of QDO in IO-QDO order. *Studies in Generative Grammar*, *14*, 519–529.
- Lee, Y., Yook, C., Lee, B., & Park, Y. (2015). Factors involved in Korean EFL learners' choice of English dative constructions. *English Teaching*, *70*, 137–157.
- Leung, Y. I. (2002). *Functional categories in second and third language acquisition: A cross-linguistic study of the acquisition of English and French by Chinese and Vietnamese speakers* [Doctoral dissertation, McGill University]. National Library of Canada.
- Li, Y.-H. A. (1990). *Order and constituency in Mandarin Chinese*. Springer. <https://doi.org/10.1007/978-94-009-1898-6>
- Lin, T.-H. J., & Huang, Y.-S. (2015). Structures of the Mandarin *gei* constructions. *Journal of East Asian Linguistics*, *24*(3), 309–338. <https://doi.org/10.1007/s10831-015-9132-3>

- Liu, F. (2006). Dative constructions in Chinese. *Language and Linguistics*, 7(4), 863–904.
- Lozano-Pozo, C. (2003). *Universal Grammar and focus constraints: The acquisition of pronouns and word order in non-native Spanish* [Doctoral dissertation, University of Essex]. ProQuest Dissertations & Theses Global.
- Malchukov, A., Haspelmath, M., & Comrie, B. (2010). Ditransitive constructions: A typological overview. In *Studies in ditransitive constructions* (pp. 1–64). De Gruyter Mouton.
- Marsden, H. (2009). Distributive quantifier scope in English-Japanese and Korean-Japanese interlanguage. *Language Acquisition*, 16(3), 135–177.
<https://doi.org/10.1080/10489220902967135>
- Matthews, S., & Yip, V. (2011). *Cantonese: A comprehensive grammar*. Routledge.
- Miller, D., & Iverson, M. (2021). Retrodiction in science: With great power comes great responsibility. *Linguistic Approaches to Bilingualism*, 11(1), 84–88.
<https://doi.org/10.1075/lab.20099.mil>
- Ministry of Education of the People’s Republic of China. (2019). *2018 nian lai hua liuxue tongji* [Statistics of the overseas students in China in 2018].
- Mo, R.-P. J., Huang, C.-R., & Chen, K. (1991, December). *Serial verb constructions in Mandarin Chinese* [Paper]. The Third International Conference on Teaching Chinese as a Second Language, Taipei, Taiwan.
- Montrul, S., Dias, R., & Santos, H. (2011). Clitics and object expression in the L3 acquisition of Brazilian Portuguese: Structural similarity matters for transfer. *Second Language Research*, 27(1), 21–58. <https://doi.org/10.1177/0267658310386649>
- Na Ranong, S., & Leung, Y. I. (2009). Null objects in L1 Thai–L2 English–L3 Chinese: An empiricist take on a theoretical problem. In Y. I. Leung (Ed.), *Third language acquisition and Universal Grammar* (pp. 162–191). Multilingual Matters.
- Oehrle, R. T. (1976). *The grammatical status of the English dative alternation* [Doctoral dissertation, Massachusetts Institute of Technology]. ProQuest Dissertations & Theses Global.
- O’Grady, W. (1991). *Categories and case: The sentence structure of Korean*. John Benjamins.
- Oh, E. (2010). Recovery from first-language transfer: The second language acquisition of English double objects by Korean speakers. *Second Language Research*, 26(3), 407–439.
<https://doi.org/10.1177/0267658310365786>

- Paradis, M. (2004). *A neurolinguistic theory of bilingualism*. John Benjamins.
<https://doi.org/10.1075/sibil.18>
- Paradis, M. (2009). *Declarative and procedural determinants of second languages*. John Benjamins.
- Park, J.-H., & Choi, I. (2018). Development of a C-test for learners of English as a foreign language. *Korean Journal of Applied Linguistics*, 34(2), 57–73.
<https://doi.org/10.17154/kjal.2018.6.34.2.57>
- Park, K.-S. (2011). Information structure and dative word order in adult L2 learners. In J. Herschensohn & D. Tanner (Eds.), *Proceedings of the 11th Generative Approaches to Second Language Acquisition Conference* (pp. 101–109). Cascadilla Proceedings Project.
- Park, K.-S. (2014). *Information structure and dative word-order alternations in English and Korean: L1 children, L2 children, and L2 adults* [Doctoral dissertation, University of Hawaii]. ProQuest Dissertations & Theses Global.
- Paul, W. (2015). *New perspectives on Chinese syntax*. De Gruyter Mouton.
- Paul, W., & Whitman, J. (2010). Applicative structure and Mandarin ditransitives. In M. Duguine, S. Huidobro, & N. Madariaga (Eds.), *Argument structure and syntactic relations: A cross-linguistic perspective* (pp. 261–282). John Benjamins.
- Pingkarawat, N. (1989). *Empty noun phrases and the theory of control, with special reference to Thai*. [Doctoral dissertation, University of Illinois at Urbana-Champaign]. ProQuest Dissertations Publishing.
- Pinker, S. (1989). *Learnability and cognition: The acquisition of argument structure*. MIT Press.
- Puig-Mayenco, E., & Rothman, J. (2020). Low proficiency does not mean *ab initio*: A methodological footnote for linguistic transfer studies. *Language Acquisition*, 27(2), 217–226. <https://doi.org/10.1080/10489223.2019.1677668>
- R core team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Rankin, T. (2014). Variational learning in L2. *Linguistic Approaches to Bilingualism*, 4(4), 432–461. <https://doi.org/10.1075/lab.4.4.02ran>
- Rothman, J. (2010). On the typological economy of syntactic transfer: Word order and relative clause high/low attachment preference in L3 Brazilian Portuguese. *International Review*

- of Applied Linguistics in Language Teaching*, 48(2–3), 245–273.
<https://doi.org/10.1515/iral.2010.011>
- Rothman, J. (2011). L3 syntactic transfer selectivity and typological determinacy: The Typological Primacy Model. *Second Language Research*, 27(1), 107–127.
<https://doi.org/10.1177/0267658310386439>
- Rothman, J. (2015). Linguistic and cognitive motivations for the Typological Primacy Model (TPM) of third language (L3) transfer: Timing of acquisition and proficiency considered. *Bilingualism: Language and Cognition*, 18(2), 179–190.
<https://doi.org/10.1017/S136672891300059X>
- Rothman, J., & Cabrelli Amaro, J. (2010). What variables condition syntactic transfer? A look at the L3 initial state. *Second Language Research*, 26(2), 189–218.
<https://doi.org/10.1177/0267658309349410>
- Rothman, J., Cabrelli Amaro, J., & de Bot, K. (2013). Third language acquisition. In J. Herschensohn & M. Young-Scholten (Eds.), *The Cambridge handbook of second language acquisition* (pp. 372–393). Cambridge University Press.
- Rothman, J., González Alonso, J., & Puig-Mayenco, E. (2019). *Third language acquisition and linguistic transfer*. Cambridge University Press.
- RStudio Team. (2019). *RStudio: Integrated development for R*. RStudio, Inc.
<http://www.rstudio.com/>
- Sánchez, L., & Bardel, C. (2017). Transfer from an L2 in third language learning: A study on L2 proficiency. In T. Angelovska & A. Hahn (Eds.), *L3 syntactic transfer: Models, new developments and implications* (pp. 223–250). John Benjamins.
<https://doi.org/10.1075/bpa.5.11san>
- Schwartz, B. D. (2004). On child L2 development of syntax and morphology. *Lingue e Linguaggio*, 1, 97–132. <https://doi.org/10.1418/13315>
- Schwartz, B. D., & Sprouse, R. A. (1994). Word order and nominative case in non-native language acquisition: A longitudinal study of (L1 Turkish) German interlanguage. In T. Hoekstra & B. D. Schwartz (Eds.), *Language acquisition studies in generative grammar* (pp. 71–89). John Benjamins.
- Schwartz, B. D., & Sprouse, R. A. (1996). L2 cognitive states and the Full Transfer/Full Access model. *Second Language Research*, 12(1), 40–72.

- Schwartz, B. D., & Sprouse, R. A. (2021a). The Full Transfer/Full Access model and L3 cognitive states. *Linguistic Approaches to Bilingualism*, 11(1), 1–29. <https://doi.org/10.1075/lab.20055.sch>
- Schwartz, B. D., & Sprouse, R. A. (2021b). In defense of ‘copying and restructuring.’ *Second Language Research*, 37(3), 489–493. <https://doi.org/10.1177/0267658320975831>
- Schwartz, B. D., & Sprouse, R. A. (2021c). Making models, making predictions. *Linguistic Approaches to Bilingualism*, 11(1), 116–129. <https://doi.org/10.1075/lab.00032.sch>
- Sharwood Smith, M., & Truscott, J. (2005). Stages or continua in second language acquisition: A MOGUL solution. *Applied Linguistics*, 26(2), 219–240. <https://doi.org/10.1093/applin/amh049>
- Siewierska, A. (2003). Person agreement and the determination of alignment. *Transactions of the Philosophical Society*, 101, 339–370.
- Slabakova, R. (2017). The scalpel model of third language acquisition. *International Journal of Bilingualism*, 21(6), 651–665. <https://doi.org/10.1177/1367006916655413>
- Slabakova, R., & García Mayo, M. del P. (2015). The L3 syntax–discourse interface. *Bilingualism: Language and Cognition*, 18(2), 208–226. <https://doi.org/10.1017/S1366728913000369>
- Slobin, D. I., & Welsh, C. A. (1973). Elicited imitation as a research tool in developmental psycholinguistics. In C. Ferguson & D. I. Slobin (Eds.), *Studies of child language development* (pp. 485–497). Holt, Rinehart & Winston.
- Sorace, A. (1996). The use of acceptability judgments in second language acquisition research. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 375–409). Elsevier. <https://doi.org/10.1016/B978-012589042-7/50014-1>
- Spinner, P., & Gass, S. M. (2019). *Using judgments in second language acquisition research*. Routledge.
- Sprouse, J., Wagers, M., & Phillips, C. (2012). A test of the relation between working-memory capacity and syntactic island effects. *Language*, 88(1), 82–123.
- Tang, C.-C. J. (1990). *Chinese phrase structure and the extended X'-theory* [Doctoral dissertation, Cornell University]. ProQuest Dissertations & Theses Global.
- Tang, S.-W. (2003). *Hanyu fangyan yufa de canshu lilun [A parametric theory of Chinese dialectal grammar]*. Peking University Press.

- Tang, S.-W., & Cheng, S.-P. (2014). Aspects of Cantonese grammar. In C.-T. J. Huang, Y.-H. A. Li, & A. Simpson (Eds.), *The handbook of Chinese linguistics* (pp. 601–628). Wiley-Blackwell.
- Tsai, W.-T. D. (2001). On subject specificity and theory of syntax-semantics interface. *Journal of East Asian Linguistics*, *10*, 129–168.
- Unsworth, S. (2016). Early child L2 acquisition: Age or input effects? Neither, or both? *Journal of Child Language*, *43*(3), 608–634. <https://doi.org/10.1017/S030500091500080X>
- Vinther, T. (2002). Elicited imitation: A brief overview. *International Journal of Applied Linguistics*, *12*(1), 54–73. <https://doi.org/10.1111/1473-4192.00024>
- Wang, P. C. (1970). *A transformational approach to Chinese ba and bei* [Doctoral dissertation, University of Texas]. ProQuest Dissertations & Theses Global.
- Westergaard, M. (2009). *The acquisition of word order: Micro-cues, information structure, and economy*. John Benjamins.
- Westergaard, M. (2021). Microvariation in multilingual situations: The importance of property-by-property acquisition. *Second Language Research*, *37*(3), 379–407. <https://doi.org/10.1177/0267658319884116>
- Westergaard, M., Mitrofanova, N., Mykhaylyk, R., & Rodina, Y. (2017). Crosslinguistic influence in the acquisition of a third language: The Linguistic Proximity Model. *International Journal of Bilingualism*, *21*(6), 666–682. <https://doi.org/10.1177/1367006916648859>
- Whong-Barr, M., & Schwartz, B. D. (2002). Morphological and syntactic transfer in child L2 acquisition of the English dative alternation. *Studies in Second Language Acquisition*, *24*(4), 579–616. <https://doi.org/10.1017/S0272263102004035>
- Woolford, E. (1993). Symmetric and asymmetric passives. *Natural Language & Linguistic Theory*, *11*(4), 679–728.
- Wu, S.-L., & Ortega, L. (2013). Measuring global oral proficiency in SLA research: A new elicited imitation test of L2 Chinese. *Foreign Language Annals*, *46*(4), 680–704. <https://doi.org/10.1111/flan.12063>
- Xu, L., & Peyraube, A. (1997). On the double object construction and the oblique construction in Cantonese. *Studies in Language*, *21*(1), 105–127. <https://doi.org/10.1075/sl.21.1.05lie>

- Yang, C., & Luo, H. (2017). The acquisition of Mandarin dative constructions by L2 and heritage learners. *Chinese as a Second Language Research*, 6(2), 251–275.
<https://doi.org/10.1515/caslar-2017-0011>
- Yang, C., & Montrul, S. (2017). Learning datives: The Tolerance Principle in monolingual and bilingual acquisition. *Second Language Research*, 33(1), 119–144.
<https://doi.org/10.1177/0267658316673686>
- Yook, C. (2012). L1 influence on ESL learners' acquisition of English ditransitive constructions. *English Teaching*, 67, 27–50.
- Yuan, B. (2013). Is Chinese 'daodi' 'the hell' in English speakers' L2 acquisition of Chinese daodi ... wh ... questions? Effects and recoverability of L1 transfer at L2 interfaces. *International Journal of Bilingualism*, 17(4), 403–430.
<https://doi.org/10.1177/1367006911435486>
- Zhang, B. (1999). Xiandai hanyu de shuangjiwu jiegoushi [Double object construction in modern Chinese]. *Zhongguo Yuwen [Studies of the Chinese Language]*, 3, 175–184.
- Zhang, B. (2009). HSK dongtai zuowen yuliaoku de tese yu gongneng [The features and functions of the HSK composition corpus]. *Guoji Hanyu Jiaoyu [International Chinese Language Education]*, 4, 23–25.
- Zhang, S. (1990). Correlations between the double object construction and preposition stranding. *Linguistic Inquiry*, 21(2), 312–316.
- Zhu, D. (1980). Yu dongci "gei" xiangguan de jufa wenti [Issues related to the verb "gei"]. *Zhongguo Shehui Kexue [Chinese Social Science]*, 1, 1–10.
- Zhu, Y., & Zhao, Y. (2016). The acquisition of the Chinese double object construction by English and Japanese speakers. *Journal of International Chinese Teaching*, 4, 58–67.